

Indian National Academy of Engineering

THE YEAR BOOK
1989

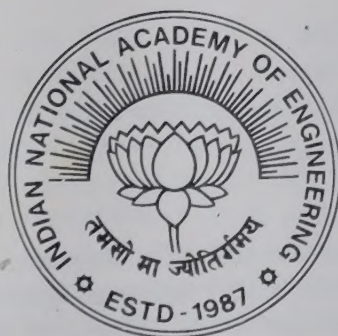






INDIAN NATIONAL ACADEMY OF ENGINEERING

THE YEAR BOOK
1989



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New Delhi
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Postal Address

Indian National Academy of Engineering
C/o The Institution of Engineers (India)
Bahadur Shah Zafar Marg
New Delhi - 110 002.
India.

Telephone:

Executive Secretary + (91)-11-3311052 (*Office*)
+ (91)-11-6435307 (*Residence*)

Published by Major General J.C. Ahluwalia (Retd),
Executive Secretary, Indian National Academy
of Engineering, New Delhi and Printed at Manish Comprint,
F-117 Sudarshan Park, New Delhi-110 015. Ph: 503066.



INAE Logo depicts a 'LOTUS' flower radiating fragrance and light in all directions. 'Lotus' is the national flower of India and is invariably used for worship. Its fragrance permeates throughout the atmosphere and imbibes a sense of purity to the people around.

The quotation in the Logo तमसो मा ज्योतिर्गमय has been taken from Vṛhadāraṇyak Upanishad. A country's progress is known from the various engineering developments that it brings up in the shortest possible time. They bring light of new hopes, encouragement and vitality to a Nation. The engineering community in India has brought fertility in waste land, water for millions, energy for industry and the household, and heavy industries for the country's progress. It has, therefore, been thought appropriate to inscribe in the Logo:

"Lead me from darkness to light"

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PREFACE

The engineering fraternity has every reason to be proud of having established an apex body of engineers from all disciplines in the form of Indian National Academy of Engineering to consider policy perspectives of the country's development to help the society in keeping the futuristic trends in view while planning for prosperity, safety and environment. The Academy has, in the last two years, accorded recognition to 98 engineers and scientists by conferring fellowship of the Academy on them for their innovations, and intend to proceed judiciously this way in future.

The Academy has been fortunate in having been blessed in founding it by the Prime Minister of India, and the Ministers of Human Resource Development and Science and Technology on April 11, 1988, and it, therefore, hopes to receive all encouragement from the Government of India and the society in general in pursuance of its noble tasks.

The Academy organised a national seminar on Policy Perspectives of Water Management at Narmadanagar in April 1989. It was attended by the top experts in this field from all over the country and the policy document is expected to be issued shortly. Similar effort is being planned for topics like "Electric Energy and Environment", "Petroleum Industries and Environment" and "Impact of Mass Communication Systems on Society" in the next year or two. It is hoped that the society and its representative governments will make appropriate use of the advice tendered by the Academy through policy documents.

Above everything else, the most important resource for growth and utility of the Academy to society lies in the interest that the fraternity of engineers, and their professional societies take in it. Engineering Community has come of age qualitatively and quantitatively, and it must cultivate pride in the contributions they have made in the country's development, in their Academy and Professional Institutions. No other section of the society has done anything to match their effort.

The Academy has already established itself as a useful forum and, I am sure the founding fathers who laboured hard to bring this about feel gratified at this development.

It is my proud privilege to place before the engineering fraternity its first annual report, which will give them all the information about the Academy.

In the end, I record my gratitude to the Council, fellowship and the official functionaries for the cooperation received by me in carrying out my duties towards the Academy

New Delhi
August 4, 1989.

JAI KRISHNA
President

EDITORIAL

It is my proud privilege to present this first Year-Book of the Indian National Academy of Engineering (INAE) to its Fellowship. It is hoped that this will serve as an important reference to all Fellows of the Academy as well as to others who would like to interact with the Academy or its individual Fellows.

The Year Book contains the composition of the current INAE Council and its Secretariat. Chapter 1 presents an historical account of the birth of the Academy; this is a condensed and revised version of an article written by our Honorary Secretary, Prof. S.N. Mitra, which was published in the Souvenir released on the occasion of the Foundation Function of the Academy held at New Delhi on April 11, 1988. The details of Fellowship and Foreign Fellowship are given in Chapters 2 and 3 while a Sectionwise list of Fellows appears in Chapter 4. All fellows of the Academy are requested to check the entries against their names in these three chapters and advise me, in the tearsheet proforma on the last page, any additions or corrections they would like to be incorporated in the next Year Book.

The compositions of the ten Sectional Committees of the Academy, who carried great responsibilities with regard to induction of new Fellows and other activities concerned with their Section, are given in Chapter 5. Chapters 6, 7 and 8 contain, respectively, the Memorandum of Association, Rules and Regulations and Ordinances which are currently in effect.

In Chapter 9, we append a brief report of the Foundation Function of the Academy, and reproduce the transcripts of the speeches delivered on this occasion by the President of the Academy and three important dignitaries of the Government of India viz, the Minister for Human Resource Development, the Minister for Science and Technology, and the Prime Minister of India. I thank each of them for according permission to include their speeches in the Year Book.

Chapter 10 contains the Annual Report of the Academy which

includes a brief account of the first major seminar under the auspices of the Academy, held at Indore during 15-17 April, 1989 on the theme of Water Management. The Year Book ends with an audited statement of accounts for the period 1988-89.

I wish to acknowledge the untiring help and active support of the Executive Secretary of the Academy, and the inspiration and moral support provided by the President, Honorary Secretary and other members of the Council in bringing out this Year Book.

Any suggestion for improving the Year Book will be highly welcome.

18 August, 1989,
New Delhi.

S.C. DUTTA ROY
Editor

GOVERNING COUNCIL (1987-89)

S.No.	Name	Office	Place of Work
1.	Professor Jai Krishna	President	Roorkee
2.	Dr. V.S. Arunachalam	Vice-President	New Delhi
3.	Dr. G.R. Toshniwal	Vice-President	Ajmer
4.	Professor S.N. Mitra	Honorary Secretary	New Delhi
5.	Professor N.M. Swani	Honorary Treasurer	New Delhi
6.	Professor G.S. Sanyal	Foreign Secretary	Kharagpur
7.	Professor S.C. Dutta Roy	Editor of Publications	New Delhi
8.	Professor A.B. Bhattacharyya	Member	New Delhi
9.	Professor A. Bhattacharyya	Member	Calcutta
10.	Professor Ashoka Chandra	Member	New Delhi
11.	Dr. A.M. Michael	Member	New Delhi
12.	Professor B.R. Nag	Member	Calcutta
13.	Dr. Bharat Singh	Member	Roorkee
14.	Dr. S. Varadarajan	Member	New Delhi
15.	Col. S.P. Wahi	Member	Dehradun

Representatives of Professional Societies

Institution of Electronics and Telecommunication Engineers

16.	Professor Bharathi Bhat	Member	New Delhi
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Institution of Engineers (India)

17.	Dr. Satish Chandra	Member	Roorkee
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Secretariat

Maj Gen J.C. Ahluwalia	Executive Secretary
Shri J.R.D. Chugh	Accounts Officer



1. AN HISTORICAL ACCOUNT *

The Engineering sector in India has the largest investment amongst all other sectors by the Government, for rapid industrialisation, quick growth and all round development. In such a gigantic task before the Government, Professional Academies, Societies, Industries, Universities, Research and Development Organisations, etc. have important roles to play. There are many professional societies in India who cater to the needs of their respective profession, by conducting examinations, publication of journals and holding seminars, conferences etc. But there was no Apex Body in India to look into the overall policies to ensure that we are on the right path. In spite of 40 years of independence, our industrial growth has not been at par even with some of the countries which were devastated during the 2nd World War and had to build their economies and industries ab initio. Indeed, some of the newly emerging countries have also gone far ahead, as compared to India. It was strongly felt by the engineering community that an Apex Body like the Indian National Academy of Engineering, consisting of most outstanding engineers in India should be formed to analyse the situation critically and suggest engineering solutions to many formidable problems facing the country.

The professional institutions and societies have been considering, for quite a long time, establishing a Federation of Engineering Societies to work as some sort of an Apex Body. The Ministry of Education took a lead in the matter and had been convening meetings from time to time with the recognised Professional Institutions for considering the creation of such a Federation. However, earlier attempts did not, for one reason or the other, succeed.

A meeting of all the recognised Professional Bodies was or-

*Based on an article under the same title by Prof. S.N. Mitra and published in the Souvenir of the INAE released on the occasion of the Foundation Function, 1988.

ganised on 17th May, 1984 by Prof. C.S. Jha, the then Educational Adviser (Technical) Ministry of Education, for discussing various problems on technical issues confronting the Ministry. In his meeting, Professor Jha made the point that there is an urgent need for a coordinating body at the highest level whom the Government can consult on all matters pertaining to engineering. A paper prepared by Prof.S.N. Mitra, representing the Institution of Electronics and Telecommunication Engineers (IETE), suggesting the creation of a National Academy of Engineering, was also presented. The Meeting decided that the ten recognised Professional Bodies might form a loose association and deliberate on the best structure for a Federal Body to be created, the National Academy of Engineering as suggested by the IETE, being a possibility. It was suggested that the working paper submitted by Prof. Mitra may be circulated to all the Professional Bodies.

It was decided that the next meeting would be held in the first/second week of July 1984 at the Institution of Engineers (IE). Col. BT Nagrani, the then Secretary & Director General of the IE agreed to host this meeting and also to act as Convener.

Pursuant to the decisions taken on 17 May 84 meeting, the Presidents/Chairmen of the Professional Bodies and their representatives met at the Institution of Engineers (India) on 30 July 84 to discuss the matter further and to arrive at a decision. At this meeting, the pros and cons of creating a National Academy of Engineering were thoroughly discussed and the desirability of setting up such an Academy as an intellectual forum for the profession was accepted. The Presidents agreed to meet at frequent intervals to discuss and develop a consensus on the structure of the Academy. In particular, they also agreed to discuss the matter in their individual governing Councils, and concretise the guidelines for the objectives, organisational structure and functions of the proposed Academy. The next meeting was decided to be held at the premises of the Aeronautical Society of India (AeSI) while the Secretariat work was to be continued to be done by the IE as the Convener of such meetings.

The second meeting, held on 17 November 1984, was hosted by the AeSI. This meeting was found to be inconvenient by many

of the Institutions, since conditions in Delhi were not very stable after the assassination of the Prime Minister of India, Shrimati Indira Gandhi on 31 Oct 84. In fact, only three Professional Institutions were represented at this meeting, and among others, the IE representative could not attend, nor could Prof. Mitra of the IETE. Prof. C.S. Jha attended the meeting. At this meeting, the creation of a National Academy of Engineering was not considered, instead, a new idea was mooted by the AeSI for the creation of a National Association or Federation or Council of Professional Bodies. It was decided that three representatives, one each from IE, IETE and the AeSI should be asked to prepare a paper on the formation of such an Association or Federation and place it before the next meeting, to be convened at New Delhi and hosted by the IETE.

This decision evoked sharp reaction from the IE and from the IETE. Both these Institutions felt that once the decision of a National Academy of Engineering had been accepted, all emphasis should first be directed towards that, and the Federation or a National Association should be considered later. Both these Institutions refused to act as per the proposal of the AeSI.

A third meeting was held on 08 March 85 at the PHD House, and was hosted by the IETE. In this meeting, nine Presidents/Chairmen and their senior colleagues were present. Prof. Jha was unable to come but Dr. Arunachalam, president of the AeSI and Scientific Advisor to the Minister of Defence, attended. The meeting was chaired by Mr. C.R. Alimachandani, President, IE, and took the following decisions:

- a) to set up an Academy of Engineering on priority basis;
- b) a Sub-committee consisting of IE, IETE, AeSI and Institute of Architects to meet and finalise the Draft Articles of Association and Byelaws for the formation of National Academy of Engineering by end of April, 1985 (The Convenor of this sub-committee will be IETE, but processing the decisions through the meeting of the Professional Societies will be the responsibility of IE as Convenor of such meetings);

- c) the IE to circulate the draft to all members by first week of May, 1985; and
- d) the next meeting of the like-minded Professional Societies to be held at Delhi and hosted by the Indian Institute of Metals on 23 May 85.

The fourth meeting was duly held on 23 May 1985 at Ispat Bhavan (Office of SAIL), Lodi Road, New Delhi and was hosted by the Institute of Metals. It was attended by the IE, the Indian Institute of Metals, the IETE, the AeSI, and the Indian Institute of Surveyors. Prof. C.S. Jha attended by special invitation, and Prof. S.N. Mitra chaired the meeting. After general discussion, the following decisions were taken at this meeting:-

- a) that an 'Indian National Academy of Engineering' be established;
- b) the Professional Societies be requested to send their comments, in writing, on the draft Articles of Association and Bye-Laws to the IE by 23 July 1985;
- c) draft Articles of Association and Byelaws to be suitably revised, taking these comments into account.
- d) the Standing Sub-committee consisting of the IE, the AeSI and the IETE to meet on 09 August, 1985 to finalise the draft Articles of Association and Byelaws;
- e) the Articles of Association and Byelaws so finalised to be circulated to all the Professional Societies by end of August 1985; and
- f) the fifth meeting of the like-minded Professional Societies to be held towards the end of September 1985 and hosted by the Institution of Surveyors, at the Indian Science Centre, New Delhi.

The fifth meeting was held on 30 September 1985 at the Indian Science Centre, New Delhi, hosted by the Institution of Surveyors. It was attended by the Institution of Surveyors, the IETE, the IE,

the Indian Institute of Metals, the Institution of Mechanical Engineers, and the AeSI. (Late) AVM NK Nair chaired the meeting. At this meeting, unfortunately, the decisions taken by the previous meetings were reversed and the situation was brought to a standstill. The representative of the Institution of Surveyors proposed that the alternative proposal (as envisaged by the AeSI in the second meeting) of forming a National Association or Federation of Professional Bodies should be discussed and decisions taken only as per the consensus. The representatives of the Institute of Metals stipulated several conditions to be fulfilled before the Academy was considered for establishment. The Indian Institute of Architects expressed serious misgivings about the name of the Academy and said that Environment should also be included. There was a prolonged discussion on the composition of the proposed Governing Council of the Academy and the basis on which this composition would be decided. Representatives of the Institution of Mechanical Engineers and the Institution of Surveyors suggested that the Fellows of the proposed Academy should be only those nominated by Professional Societies. The representatives of the Institution of Surveyors suggested that there should be one Vice-President from each Professional Body, who would be a member of the Council of the Academy. He further proposed that there should be equal representation on the Council of the Academy from each Professional Body. The President of the Council could be nominated by turn from those of the Professional Bodies.

Prof. Mitra of IETE expressed strong reservations on the above suggestions, and observed that excellence in profession should be the only criterion on which Fellows should be nominated and selected to the Academy. If excellence became the criterion there was no need to stipulate any fixed number from Professional Societies for election as Fellows. His suggestions for Foreign Fellows nominated to the Academy to ensure reciprocal privileges, did not find favour with the other representatives. Only the IE representative supported the views expressed by IETE. The decisions, with notes of dissent from IETE and IE, were as follows:-

- a) The name of the organisation should be 'Indian National Academy of Engineering'.

- b) There should be equal representation on the Council from each of the 11 Professional Bodies recognised by the Central Government at present.
- c) There could be, to start with, 30 Fellows and three members on the Council nominated by each Professional Body. There could be representatives from the Ministry of Human Resource Development and the Prime Minister's Secretariat. Representation on the Council from other Academies, such as Indian National Science Academy, should be on a reciprocal basis.
- d) Fellows to be nominated to the Academy by each Professional Body should conform to the broad guidelines laid down in regard to their qualification, experience and excellence in their professional field. There should be no further scrutiny in regard to their excellence before admission as Fellows to the Academy.
- e) There need be no grade of Foreign Fellows nominated to the Academy. Even without such Foreign Fellows in the Academy, it would be possible to arrange for reciprocal facilities with similar organisations abroad.
- f) After the Articles of Association and Bye-Laws have been finalised, there should be an Organising Committee with two representatives from each professional body, who will take all necessary action for the formation of the Council including deciding on the first President.

The above decisions evoked strong reaction and resentment from IETE. Prof. Mitra of IETE wrote a letter to (Late) AVM NK Nair, the Chairman of the fifth meeting conveying IETE's strong opposition to the decisions as given in the Annexure.

FURTHER ACTION

Since the meeting of the like-minded Professional Societies could not arrive at unanimous decisions on the establishment of the Academy, Prof. S.N. Mitra, a Past president of IETE and Prof. A. Bhattacharyya, a Past President of IE got together on 30th

September 1985 and decided to jointly sponsor the Academy, as was originally envisaged by Prof. Mitra. They were joined by Dr. G.R. Toshniwal, a Past President IETE, Mr. K.N. Majumdar, Deputy Director General, IE and Maj Gen J.C. Ahluwalia, Secretary IETE at IETE Headquarters; they scrutinised the draft Memorandum of Association and Rules & Regulations of the Academy, prepared by Prof. Mitra earlier, and finalised the same. Meanwhile, Prof. Mitra received formal approval of the IE and IETE to go ahead in establishing the Academy as per the finalised Memorandum of Association and Rules and Regulations.

The finalised draft of Memorandum of Association and Rules and Regulations was submitted in early 1986 to the Registrar of Societies for registration of the Academy.

There were about a dozen meetings with the Registrar of Societies to explain the purpose of establishing the Academy and the benefits that will accrue to the engineers and the society, and the Memorandum of Association and Rules and Regulations of the Academy had to be revised a number of times before the Registrar accepted them for registration.

A new problem arose towards the end of May 1986. The Registrar intimated that since the Academy was being established in the Union Territory of Delhi, she (the Registrar was a lady) had no authority to permit the use of the word 'National' in the name of the Academy. She was requested to get the concurrence of the Government of India, who had jurisdiction throughout India. The operative Ministry for Registrar of Societies is the Ministry of Civil Supplies to whom the case was sent for approval. There was some delay as the Ministry of Civil Supplies was, perhaps, not equipped to decide such cases. They sent it to the Ministry of Human Resource Development (HRD), Department of Education, for their views.

The case was much delayed in the Ministry of HRD and had to be pursued vigorously. Towards the end of 1986, a meeting was called by Prof. Ashoka Chandra, Educational Adviser (Technical). This meeting was attended by Prof. A.B. Bhattacharyya of Indian Institute of Technology, Delhi, Mr. K.N. Majumdar of IE, Prof.

S.N.Mitra of IETE and Maj Gen J.C. Ahluwalia, Secretary IETE. The Ministry wanted that in the Objectives and Rules and Regulations of the Academy, emphasis should be laid upon the Government of India's National Education Policy, as adopted by the Parliament in August 1986. Suitable amendments were made and the Memorandum of Association and Rules and Regulations of the Academy were finally approved by the Ministry of HRD with the name as Indian National Academy of Engineering. It took another 4 weeks before the approved copy was finally released by the Ministry of HRD. It went again through Ministry of Civil Supplies and, after their approval, was sent to the Registrar of Societies. After another iteration at the Registrar's office, she issued the Certificate of Registration on 20 April 1987.

The Indian National Academy of Engineering was thus born.

Annexure

THE INSTITUTION OF ELECTRONICS AND TELECOMMUNICATION ENGINEERS

2 Institutional Area, Lodi Road
New Delhi-110003

Ref: IETE/173/Adm/85

15 Oct 85

The Aeronautical Society of India,
13-B, Indraprastha Estate,
New Delhi-110 002

Kind Attn: AVM N.K. Nair, Hony Secretary

Dear Sir,

Kindly refer to your letter No. INAE/85/ASI dated 03 Oct 85 circulating the draft summary of proceedings of the meeting.

2. The views of the IETE are as follows:

- a) The IETE has been bewildered by the proceedings of the meeting as it is found that decisions already taken in the previous meetings have been allowed to be reopened by the Chairman of this meeting.
- b) In the 30 Sep 85 Meeting, Dr. L.R. Vaidyanath of the Indian Institute of Metals and Mr. H.M. Desai of Institution of Mechanical Engineers (I) made their appearance for the first time. Both of them raised issues which were already debated earlier and decided upon. It was most surprising to note that the Chairman had allowed them to reopen these issues and decisions taken on the basis of their points of view completely disregarding earlier decisions. It was most unfortunate to note that the Chairman concurred with the view of Institute of Metals and Institution of Mechanical Engineers while he was a party to the earlier decisions. When this was pointed out, the Chairman mentioned that everybody had the right to raise any questions they liked in this august body of representatives from all professional institutions. If such were the case, no final decisions can ever be

taken at any of the meetings and we wish that the Chairman had pointed out the decisions already taken and not allowed them to be reopened. Shri Desai confessed that he had not read the draft Bye-laws etc. and decisions of previous three meetings (30 Jul 84, 08 Mar 85 and 23 May 85). He sent a paper stressing the formation of a Federation of recognised Professional Institutions, as suggested by Ministry of Education in 1982. He was not aware as he did not read the previous papers circulated by IE(I) on subsequent meetings and decisions. IETE feels that this was most inopportune.

In regard to the decisions conveyed at page 4 of the draft minutes, we had strong reservations and gave a note of dissent to the decisions taken. Unfortunately, this has not been included in the Minutes. Our main objections are the following:-

- a) We do not agree that there should be equal representation on the Council from each of the 11 professional bodies recognised by the Central Govt. at present. This would tantamount to a Federation and not an Academy. If this be given effect to, then all the professions practised by the Institution of Engineers (I) shall find a place and some of the Professional Institutions whose membership is much lower than that of the Institution of Engineers in the same discipline cannot find a place in the Council at all.
- b) It seems to us that idea of Federation has struck deep roots in the minds of the various people at present and it would not be possible to think of an Academy of Excellence which would consist of outstanding engineers in the country and whose advice and assistance would be sought by the Government.
- c) The Council should be constituted, in our opinion, only on adult franchise from the Fellows on the rolls and not according to the Professional Institutions.
- d) We believe that membership of Foreign Fellows will be extremely important to the Academy for obtaining reciprocal relationship by Inter-Academy exchange of programme.

- e) There should be no Organising Committee with two representatives from each Professional Body. It again means a Federation and not an Academy.

We are constrained to give our note of dissent and we would like the views of other Professional Institutions in this regard.

The Chairman, in the draft minutes, has indicated in para 20 that views were taken at this meeting on the basis of consensus. We wish to point out that at this meeting views were expressed only by (a) Institution of Surveyors (b) Indian Institute of Metals (c) Institution of Mechanical Engineers (d) Aeronautical Society of India. IETE and IE(I) did not express any views. Prof. Bhattacharyya, Past President of IE(I) could not attend the meeting. Of these, representatives from Indian Institute of Metals and Institution of Mechanical Engineers came for the first time and were not aware of past decisions. This leaves common views of Institution of Surveyors and Aeronautical Society of India contrary to their views in the past meeting, as against the views expressed by IETE. We cannot agree with the conclusions as summarised in para 20 since our views do not figure in there as brought out in para 15. We also wish to put on record that the Aeronautical Society of India, as Chairman of this Meeting, has succeeded, by reversing its stand, in putting the clock back and made the good work so far completely ineffective.

We wish to reiterate that these draft minutes should have been sent only to IE(I) as Convenor of all the Meetings of the like-minded Professional Societies for the establishment of the Indian National Academy of Engineering. The comments as sought for through the draft minutes may be sent to IE(I) and the finalised minutes issued by the Institution of Engineers.

Thanking you,

Yours faithfully,

(S.N. Mitra)

Copy to: Secretary and Director General, Institution of Engineers,
Presidents of 11 Professional Institutions.

2. THE FELLOWSHIP 1989

Fellows

Service on Council

- + **ALIMCHANDANI**, Chander Rupchand, (b.1925), B.E., F.I.E., (*Specialisation: Architecture and Structural Design*), Chairman and Managing Director, STUP Consultants Ltd., 1004-5 & 7, Raheja Chambers, 213 Nariman Point, Bombay-400 021; Tel. 232334, 232371, 232365 (Off); 2048424, 8125624(R); (S-I, e.1987)

- + **ANANTHARAMAN**, Tanjore Ramchandra, (b.1927), D.I.I.Sc., D.Phil. (Oxon), F.N.A., F.A.Sc., F.I.E., F.I.M. (Lond), (*Specialisation: Physical Metallurgy and Materials Technology*), Director, Thapar Institute of Engg. & Technology and Thapar Corporate Research and Development Centre, Patiala-147 001; Tel. 76264, 75507 (Off), 75525, 73748 (R); (S-VIII, e. 1987)

- ANANTHANARAYANA**, N., (b.1934), D.Engg., (*Specialisation: Engineering Mechanics, Earthquake, Wind and Track Train Dynamics*), Addl. Director General, Research Designs and Standards Organisation, Ministry of Railways, Manak Nagar, Lucknow-226011; Res: A-10, Manak Nagar, RDSO Colony, Lucknow-226011. Tel. 50017 (Off) 50620 (R); (S-I, e.1989)

- + **ANTIA**, Dara Pirojshaw, (b.1914), Sc.D.(MIT), F.N.A., (*Specialisation: Metallurgical Engineering and Industrial Management*), Industrial and Management Consultant, Flat A-7, Ashoka, 3 Naylor Road, Pune-411 001; (S-VIII, e.1987)

- ARUNACHALAM**, Vallampadugal Srinivasa V.P. Raghavan, (b.1935), Ph.D., F.N.A., F.A.Sc., 1987-89

Abbreviations used: b-year of birth; Tel. - Telephone Number; Off. - Office; Res, R- Residence; S-Section; e-year of election;
+ Life Fellow

Fellows

Service on
Council

(**Specialisation: Physical and Mechanical and Powder Metallurgy**), Scientific Adviser to the Minister of Defence and Secretary, Deptt. of Defence Research and Development and Director-General R&D Organisation, Ministry of Defence, South Block, New Delhi-110 011; Res: 82, Lodi Estate, New Delhi-110 003; Tel.3011519 (off), 697602 (R); (S-VIII, e. 1987)

+ **ARYA**, Anand Swarup, (b.1931), Ph.D., F.N.A., F.I.E., (**Specialisation: Earthquake and Structural Engineering**), Professor and Ex-Prof-Vice-Chancellor, University of Roorkee, Roorkee-247667; Res: 72/6, Civil Lines Roorkee-247667; Tel.2349/Ext.20 (Off), 2631 (R); (S-I, e. 1987)

+ **BASU**, Sushil Kumar, (b.1931), Ph.D.(Moscow), D.Sc.(BU), F.I.Mech. E(Lond.), F.I.E., F.O.R.S.I., (**Specialisation: Production Engineering**), Professor of Production Engineering, Jadavpur University, Calcutta-700032; Res: Flat D-1, 77/2/1A, Bade Raipur Road, Calcutta-700032; Tel.721890 (Off), 726970(R); (S-III, e.1987)

+ **BHANDARI**, Rajendra Kumar, (b.1941), Ph.D., (**Specialisation: Geotechnical Engineering**), Director, Central Building Research Institute, Roorkee-247667; Res: A-11, Shantinagar, Roorkee-247667 (UP), Tel.2243 (C^{tn}), 2271 (R); (S-I, e. 1988)

+ **BHAT**, Bharathi, (b. 1941), Ph.D., F.I.E.T.E., (**Specialisation: Microwave and Millimeter Wave Engineering**), Professor, Centre for Applied Research in Electronics, Indian Institute of Technology, New Delhi-110016; Res:16, West Avenue, IIT Estate, New Delhi-110016; Tel. 665674(Off), (S-VI, e.1987)

1987-89

+ **BHATTACHARYYA**, Amalendu Bhushan, (b.1937) Ph.D., F.N.A., (**Specialisation: Microelectronics**),

1987-89

Fellows

Service on
Council

Professor & Head, Centre for Applied Research in Electronics, Indian Institute of Technology, New Delhi-110016; Res: 5, New Campus, IIT Estate, Hauz Khas, New Delhi-110016; Tel. 665674 (Off), 654228(R); (S-VI, e.1987)

BHATTACHARYYA, Amitabha, (b.1931), Ph.D., F.N.A., F.I.E., (**Specialisation: Machine Tool Technology, Production Engineering**), Head Production Engineering, Jadavpur University, Calcutta-700032; Res: 26/B, Ramchand De Street, Bratachari Dham, PO & Village Dakshin, Jagaddal-743379 (WB); Tel.721890 (Off), 619494(R); (S-III, e.1987) 1987-89

BHIDAY, Madhao Ramchandra, (b.1923), Ph.D.(Nagpur), Ph.D.(Lond.), S.M.I.E.E.E., F.M.A.S.; (**Specialisation: Nuclear Physics, Accelerator Engineering, Electronics Engineering**), Former Chairman School of Communication Studies, University of Poona, Pune-411007; Res: 100 B, Kalpana Apartments, Erandwane, Pune-410004; (S-VI, e. 1987)

+ **BOSE**, Arabindo Nath, (b.1922), Ph.D.(MIT), (**Specialisation: Food Technology, Aquacultural Engineering**), Advisor, Aquacultural Engineering, Indian Institute of Technology, Kharagpur-721302; Res: 293/1, Raja Rammohan Roy Road, Calcutta-700041; Tel.772287(R); (S-IV, e.1987)

+ **CHANDRA**, Ashoka, (b.1942), Ph.D.(Cornell), F.N.A.Sc., F.I.E.T.E., (**Specialisation: Electronics, Materials Science, Educational Technology and Management**), Educational Advisor (Tech.), Department of Education, Ministry of Human Resource Development, Shastri Bhavan, New Delhi-110001; Res. 3A, Shivalik Apartments, Kalkaji Extn, New Delhi-110019; Tel.381096(Off), 6439385(R); (S-X, e. 1987) 1987-89

+ **CHANDRA**, Satish, (b.1934), Ph.D., F.I.E., 1987-89

Fellows

Service on
Council

- (**Specialisation: Hydrology and Water Resources Engineering**); Director, National Institute of Hydrology, Roorkee-247 667; Res. 95, Vigyan Kunj, UOR Campus, Roorkee-247667; Tel. 2106 (Off), 2109 (R); (S-II, e. 1987)
- + **CHOUDHURY**, Jyotsna Kumar, (b.1923), Ph.D., M.Sc. Tech. (Manch), F.I.E., F.I.I.S.T., F.I.S.I., (**Specialisation: Electrical Measurements and Standardisation and Instrumentation**), Formerly, Professor of Electrical Engineering, Jadavpur University, Calcutta-700032, Res: 23-A, Jadavpur North Road, Calcutta-700032; Tel: 723114, 722807(R) (S-V, e.1987)
- + **CHAUHAN**, Harendra Singh (b.1936), Ph.D. (Ohio), (**Specialisation: Agricultural Engineering**), Dean of Postgraduate Studies, G.B. Pant University of Agriculture and Technology, Pantnagar-263145 (UP); Res: Quarter No.V/1356, G.B. Pant University of Agriculture and Technology, Pantnagar-263145(UP) (S-III, e.1988)
- + **CHITALE**, Madhav Atmaram, (b.1934), B.E., F.I.E., (**Specialisation: Water Resources Engineering**), Secretary to the Government of India, Ministry of Water Resources, Shram Shakti Bhawan, Rafi Marg, New Delhi-110001; Res. D-4-1, MS Flats, Sector XIII, R K Puram, New Delhi-110066; Tel 383098, 385919 (Off), 679032(R) (S-II, e. 1987)
- + **CHOPRA**, Kasturi Lal, (b.1933), Ph.D., F.N.A., F.A.Sc., (**Specialisation: Solid State Physics, Thin Film Technology**), Director, Indian Institute of Technology, Kharagpur-721 302 (WB); Res: Director's Lodge, IIT, Kharagpur-721302 (WB), Tel.03222-221, Extn 386 (Off), Extn 401 (R); (S-VIII, e.1987)
- + **DAS**, Biswa Nath, (b.1930), Ph.D., F.N.A., (**Specialisation: Electromagnetics, Antenna and Micro-**

Fellows

Service on
Council

wave Engineering), Professor, Department of Electronics and Electrical Communication Engineering, Indian Institute of Technology, Kharagpur-721302 (WB), Res: Quarter No A-13, IIT Campus, Kharagpur 721302; Tel: 03222-492 (Off) (S-VI, e. 1988)

+ **DHIR**, Mittar Pal, (b.1935), Ph.D., F.I.E., (*Specialisation: Highway Engineering*), Director, Central Road Research Institute, Mathura Road, New Delhi-110 020; Res: A-1/33, Safdarjang Enclave, New Delhi-110 029; Tel: 631959, 635373 (Off), 608869 (R); (S-VII, e.1989)

+ **DE**, Arun Kumar, (b.1925), Ph.D., F.I.E., (*Specialisation: Production Engineering & Machine Tool Design*); Chairman, Atomic Energy Regulatory Board, Vikram Sarabhai Bhavan, 4th Floor, Anushaktinagar, Bombay-400094 Res: 9-B, 'Zerlina' DAE Officers Apartments, Little Gibbs Road, Malabar Hill, Bombay-400006 Tel: 5519843, 2024334 (Off), 8281058 (R); (S-III, e.1987)

DOGRA, Rajinder Nath, (b.1908), Ph.D. (Honoris Causa), M.Sc. (Highway Engg.), D.I.C. (Lond), F.I.C., F.I.E., (*Specialisation: Structural Engineering, Educational Management*); Formerly Director, IIT, New Delhi, Retired as Minister for Education and Science, Indian High Commission, London, Honorary Adviser, Postgraduate Institute of Medical Education & Research, Chandigarh; Res: House No.4, Sector 5, Chandigarh; (S-X, e.1987)

+ **DRAVID**, Arun Nilkanth, (b.1943), D.Sc., M.I.I.Chem.E(I), (*Specialisation: Chemical Engineering*); Managing Director, Humphreys & Glasgow Consultants Pvt. Ltd., Gammon House, Veer Savarkar Marg, Prabhadevi, Bombay-400025; Res: W-5, Prathamesh Cooperative Housing Society, Prabhadevi, Bombay-400025; (S-IV, e.1989)

Fellows

Service on
Council

- + **DUTTA MAJUMDER**, Dwijesh Kumar, (b.1932), Ph.D., F.N.A., (*Specialisation: Pattern Recognition, Computers Communication and Control Science*); Professor and Head, Electronics and Communication Sciences Unit, Indian Statistical Institute, 203, B.T. Road, Calcutta-700035; Res: 155, Ashokgarh, Calcutta-700035; Tel.566684, 527694 (Off), 522475 (R); (S-VI, e.1988)

- + **DUTTA ROY**, Suhash Chandra, (b.1937), D.Phil., F.N.A., F.A.Sc., FIETE, (*Specialisation: Circuits, System and Signal Processing*), Professor, Department of Electrical Engineering, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Res: Bungalow No.13, West Avenue, IIT Estate, Hauz Khas, New Delhi-110016; Tel.653749(Off), 666979/Ext.268(R); (S-VI, e.1987) Ed. Pub.
1987-89

- + **FRAMJI**, Kavasji Kaikhosrou, (b.1908), B.Sc.(Engg.), Ph.D. (Honoris Causa), F.I.E, F.I.C.E, F.Am.S.C.E., F.I.S.I., M. IAHR, (*Specialisation: Water Resources*); Chairman, Consulting Engineering Services (I) Pvt. Ltd., 'MANUSHA', 57, Nehru Place, New Delhi-110019; Res; 'White Haven', 17, Dr. Coyaji Road, Pune-411001; Tel. 6415264 (Off), Pune-664242 (R); (S-II, e.1987)

- + **GARDE**, Ramachandra Janardan, (b.1929), Ph.D., D.Sc., F.N.A., (*Specialisation: Fluvial Hydraulics, Fluid Mechanics*); Pro-Vice-Chancellor, Indira Gandhi National Open University, YMCA Cultural Centre, 1 Jai Singh Road, New Delhi - 110001; Res: C-25, Asiad Village, New Delhi 110049; Tel. 351219 (Off), 6442685 (Res); (S-II, e.1987)

- + **GHOSE**, Ajoy Kumar, (b.1934), A.I.S.M.(Min), F.C.C., F.I.E., (*Specialisation: Rock Mechanics & Ground Control and Rock Mass Classification and Hydraulic Stowing*); Professor, Department of Min-

Fellows

Service on
Council

- ing Engineering and Dean of Planning and Development, Indian School of Mines, Dhanbad-826004
Res: Bungalow No 1/Type VI, ISM Campus, Dhanbad, 826004; Tel: EPBX Nos: 2866,3309,2403 (Off), EPBX Nos: 3309,2403, 2866 (Res); (S-VIII, e.1987)
- + **GHOSE**, Tarun Kumar, (b.1924), Ph.D. (Zurich), F.N.A.Sc., (*Specialisation: Biotechnology and Biochemical Engineering*), Senior Professor, Department of Biochemical Engineering Research Centre, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Res: 9, West Avenue, IIT Campus, Hauz Khas, New Delhi-110016 Tel.654023 (Off), 6862208 (R); (S-IX, e.1987)
- + **GUHA**, Sujoy Kumar, (b 1940), Ph.D.(St.Louis)., (*Specialisation: Biomedical Engineering*); Professor and Head, Centre for Biomedical Engineering, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Res: 32, West Avenue, IIT, Hauz Khas, New Delhi-110016; (S-IX, e.1989)
- + **GOWARIKER**, Vasant Ranchhod, (b.1933), Ph.D.(Birmingham) D.Sc., F.A.Sc., F.N.A.Sc., (*Specialisation: Solid Propellant Fuel Technology, Polymers and Special Chemicals for Rockets and Space Applications*); Secretary, Department of Science and Technology, Technology Bhawan, New Mehrauli Road, New Delhi-110016; Res: 2, Lodi Estate, New Delhi-110003; Tel.661439, 660068 (Off), 618434 (R); (S-IV, e. 1987)
- GUPTA**, Suresh Chandra, (b.1934), Ph.D.(E.E.)., (*Specialisation: Control and Instrumentation for Space*); Director, Vikram Sarabhai Space centre, Trivandrum-695022; Res: Vidya-UP-5/241, Pulayanarkotta Road, Cheruvikkal, Trivandrum-695031 Tel.563567, 75405 (Off), 72963 (R); (S-VII, e.1987)

Fellows

Service on
Council

- + **INDIRESAN**, Pavagada Venkata, (b.1928), Ph.D.(Birmingham), Dist FIETE., (**Specialisation: Communication Engineering**), Professor, Centre for Applied Research in Electronics, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Res: 11, West Avenue, IIT Estate, Hauz Khas, New Delhi-110016; Tel.653750 (Off), 662431 (R); (S-VI, e.1988)
- + **IYENGAR**, K.T. Sundara Raja, (b.1927), Dr. Ing., (**Specialisation: Structural Engineering and Engineering Mechanics**); UGC Emeritus Fellow, Department of Civil Engineering, Indian Institute of Science, Bangalore-560012; Res: 101, 4th Main, 10th Cross, Malleswaram, Bangalore-560003; Tel.344411/Ext.324 (Off), 368799 (R); (S-I, e.1987)
- + **JAIN**, Raj Kumar, (b.1931), B.E., F.I.E., F.I.P.W.E., F.I.R.T., M.A.R.E.A., M.I.G.S., (**Specialisation: Civil Engineering Construction, Railway Engineering and Management**) Ex-Chairman, Railway Board, Rail Bhawan, New Delhi-110001; Res: 21, Balwantraj Mehta Lane, Kasturba Gandhi Marg, New Delhi-110001 (s-VII, e.1987)
- + **JHA**, Chandra Sekhar, (b.1934), Ph.D.(Bristol), F.I.E.; (**Specialisation: Electrical Machines**); Professor, Department of Electrical Engineering, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Res: 4, West Avenue, IIT Estate, Hauz Khas, New Delhi-110016; Tel.653778(Off), 653714(R); (S-V, e.1988)
- + **KALAM**, Auul Pakir Jainulabdeen Abdul, (b.1931), D.M.I.T., F.A.Sc., (**Specialisation: Space and Missile Technology**); Director, Defence Research and Development Laboratory, Chandranarayanagutta Lines, Kanchan Bagh, PO, Hyderabad-500258; Res: Defence Labs Officers Institute, Kanchan Bagh PO, Hyderabad 500258, Tel.239546, 239109, (Off), 239010 (R), (S-VII, e.1987)

Fellows

Service on
Council

- + **KHANNA**, Purushottam, (b.1942), Ph.D., (*Specialisation: Environmental Engineering*); Director, National Environmental Engineering Research Institute, Nehru Marg, Nagpur-440020; Res: A&B Bungalow, NEERI Colony, Nagpur-440020; Tel.23893 (Off),25222(R) (S-IX, e.1987)

- + **KHANNA**, Sudarshan Kumar, (b.1932), Ph.D.(Wisconsin), F.N.A.Sc., (*Specialisation: Transportation Engineering*) Secretary, University Grants Commission, Bahadur Shah Zafar Marg, New Delhi-110 002; Res D-II/363, Pandara Road, New Delhi-110 001. Tel.3318858 (Off), 381158 (R); (S-VII, e.1987)

- + **KRISHNA**, Jai, (b 1912), Ph.D., D.Sc., D.Engg., F.N.A., Hony Fellow IE, Hony Fellow N.A.E.(USA); Hony Fellow TWAS, Hony Fellow IAEE, (*Specialisation: Earthquake Engineering*) Professor Emeritus, University of Roorkee, Roorkee-247667; Res: 61, Civil Lines, Roorkee-247667; Tel.2338(R); (S-I, e.1987) Pres.
1987-89

- + **KRISHNA**, Prem, (b.1938), Ph.D., F.I.E., (*Specialisation: Long Span Structures and Industrial Aerodynamics*); Professor, Department of Civil Engineering and Dean of Research and Industrial Liaison, University of Roorkee-247667 Res: 61 Civil Lines, Roorkee-247667. Tel.2349 / Extn 28 (Off), 2338(R); (S-I, e.1987)

- KRISHNAN**, Rangachari, (b.1935), Ph.D., F.N.A., F.A.Sc., F.I.M.(Lond.), (*Specialisation: Physical Metallurgy, Material Sciences*); Chief Controller (R&D), Defence Research & Development Organisation, Ministry of Defence 'B' Wing, Sena Bhawan, New Delhi-110011 Res: D-2/1, Sector XIII, MS Flats, R.K. Puram, New Delhi-110066, Tel.3016802(Off), 6872154(R); (S-VIII, e.1988)

- + **KULANDAISWAMY**, V.C., (b.1929), Ph.D.(Illinois),

Fellows

Service on
Council

D.Litt., F.N.A.Sc., F.I.E., M. IAHR., (**Specialisation: Hydraulics and Water Resources**); Vice-Chancellor, Anna University, Madras-600025; Res: No.23, M.G.R. Road, Besant Nagar, Madras-600090. Tel.414545 (Off), 413200, 418000 (R); (S-II, e.1987)

+ KUMAR, Rajinder, (b.1934), Ph.D., F.N.A., F.A.Sc., (**Specialisation: Multiphase Phenomena**); Professor, Deptt. of Chemical Engineering, Indian Institute of Science, Bangalore-560012; Res: 47/1, 7th Cross, 5th Main, Malleswaram, Bangalore-560003; (Tel.344411/Ext.320(Off), 366394 (R); (S-IV, e.1987)

MASHELKAR, Raghunath Anant, (b.1943), Ph.D., F.N.A., F.A.Sc., (**Specialisation: Polymer Science & Engineering**); Deputy Director and Head, Chemical Engineering Division, National Chemical Laboratory, Pune-411008; Res: B-1, NCL Colony, Pashan Road, Pune-411008; Tel.53941 (Off), 56912 (R); (S-IV, e.1987)

MICHAEL, Arayathinal M. (b.1930), Ph.D., F.I.E., F.I.S.A.E., (**Specialisation: Irrigation Water Management, Agricultural Engineering**); Director, Indian Agricultural Research Institute, New Delhi-110012; Res: Bungalow No. B-8, IARI Campus, New Delhi-110012; Tel. 581493 (Off), 589530 (R); (S-III, e. 1987)

1987-89

+ MITRA, Sukhendra Nath, (b.1921), M.Sc. (Cal et. Cantab), F.N.A., F.R.A.S. (Lond.), F.A.F.Sc., Dist F.I.E.T.E., F.I.E., F.I.S.I., Technical Director, Toshniwal Brothers Private Ltd., 3E/8, Jhandewalan Extension, New Delhi-110055; Res: 2/14, Shanti Niketan, New Delhi-110021; Tel. 523366, 533597, 523697, 523932 (Off), 671543 (R); (S-VI, e.1987)

Hon. Sec.
1987-89

MOHAN, Dinesh, (b.1922), C.E. (Hons), F.N.A., F.A.S.C.E., F.I.E., (**Specialisation: Soil Mechanics**)

Fellows

Service on
Council

and Foundation Engineering); Formerly Director, Central Building Research Institute, Roorkee; Res: R-1/19, Rajnagar, Ghaziabad (UP); Tel. 650516, 662436 (Off), 846260(R); (S-I, e.1987)

- + **MUKHERJEA**, Ram Narayan, (b.1927), Dr. rer. nat.(Stuttgart), F.I.E, M.A.I. Chem.E., M.I.I.Chem. E.(I); (**Specialisation: Biotechnology, Polymer Engineering**); Professor, Department of Chemical Engineering, Jadavpur University, Calcutta-700032; Res: 4C, Waudi Street, Calcutta-700029; Tel.724044 (Off), 46566(R); (S-IV, e.1987)

- + **MUNJAL**, Manohar Lal, (b.1945), Ph.D., F.N.A., F.A.Sc., (**Specialisation: Technical Acoustics**); Professor, Department of Mechanical Engineering, Indian Institute of Science, Bangalore-560012; Res: Staff Qr. No. D-220, IISc Campus, Bangalore-560012; Tel.344411/Ext.303 (Off), 369326 (R); (S-III, e. 1987)

- + **MURTHY**, P.N., (b.1928), Ph.D., (**Specialisation: Aerspace Engineering**); Consulting Advisor and Head of Systems Engineering, Cybernetics Centre, Tata Consultancy Services, Shakar Bhavan, 5-10-174; Fateh Maidan Road, Hyderabad-500004; Tel.231247, 234493 (Off), 224221, 221465 (R); (S-VII, e.1987)

NAG, Biswa Ranjan, (b.1932), Ph.D., D.Sc., F.N.A.; F.I.E., (**Specialisation: Solid State Electronics**); Professor, University College of Technology, Institute of Radio Physics and Electronics, 92, Acharya Prafulla Chandra Road, Calcutta-700009; Res: EC 203, Bidhan Nagar, Calcutta-700064; Tel.359115(Off), 359900(R); (S-VI, e.1987)

1987-89

NAKRA, Bahadur Chand, (b.1939), Ph.D., F.N.A., F.I.E., (**Specialisation: Vibrations Engineering**); Professor, Department of Mechanical Engineering,

Fellows

Service on
Council

Indian Institute of Technology, Hauz Khas, New Delhi-110 016; Res: C-2, IIT Estate, Hauz Khas, New Delhi-110 016; Tel.6862153(Off), 6862154 (R), (S-III, e.1987)

+ **NANDA**, Janardan, (b.1937), Ph.D., F.N.A., (*Specialisation: Electrical Power System Engineering*); Professor of Electrical Engineering, Dean of Undergraduate Studies and Joint Professor, Centre of Energy Studies, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Res: 3, Central Avenue, IIT Estate, Hauz Khas, New Delhi-110016; Tel.654488 (Off), 653722 (R); (S-V, e.1988)

+ **NARASIMHA**, Roddam, (b.1933), Ph.D.(California), F.N.A., F.A.Sc.; Hony Fellow AeSI, (*Specialisation: Fluid Mechanics, Aerospace Engineering and Atmospheric Sciences*); Director, National Aeronautical Laboratory, Post Box No.1779, Bangalore-560017; Res:1/B, Hospital Extension, Hebbal, Bangalore-560024, Tel.570584, 565579 (Off), 342705 (R); (S-VII, e.1987)

+ **NARASIMHAN**, Sampathiengar, (b.1930), Ph.D.(Iowa), (*Specialisation: Fluid Mechanics, Hydraulic Engineering, Water Resources Engineering, Coastal and Off-shore Engineering*); Professor, Department of Civil Engineering, Indian Institute of Technology, Powai, Bombay-400076; Res: A-16, IIT Campus, Powai, Bombay-400076; (S-II, e.1988)

+ **NIGAM**, Navin Chandra, (b.1937), Ph.D.(Cal. Tech.), F.I.E., (*Specialisation: Structural Mechanics, Earthquake Engineering and Aerospace Engineering*); Director, Indian institute of Technology, Hauz Khas, New Delhi-1100016; Res: Director's Lodge, IIT Estate, Hauz Khas, New Delhi-110016; Tel.665675 (Off), 663425 (R); (S-VII, e.1987)

PADHYE, Madhav Gobind, (b.1927), B.E., M.I.E.,

Fellows

Service on
Council

M.I.G.S., (*Specialisation: Water Resources Engineering*); Formerly Secretary to the Government of India, Ministry of Irrigation, New Delhi and Ex-Chairman, Central Water Commission; Res: 'Kalashree' 6th Lane, Prabhat Road, Pune-411004; (S-II, e.1988)

+ PAL, Yash, (b.1926), Ph.D., F.N.A., F.A.Sc., F.N.A.Sc., (*Specialisation: High Energy Physics and Astrophysics, Science Education, Space Technology and Communication*); Chairman, University Grants Commission, Bahadur Shah Zafar Marg, New Delhi-110002, Tel.3317143 (Off), 385309 (R), (S-VII, e.1987)

+ PATEL, Chandrakant Chhotabnai, (b.1926), Ph.D., F.I.E., (*Specialisation: Water Resources Development*), Formerly Secretary Irrigation, Government of India, Chairman and Managing Director, C.C. Patel and Associates Pvt. Ltd., D-6/19, Vasant Vihar, New Delhi-110057, Tel.677521, 6872313 (Off); (S-II, e.1989)

+ RAJARAMAN, Vidyaswaran, (b.1933), Ph.D (Wisconsin), F.N.A., F.A.Sc., F.I.E.T.E., (*Specialisation: Computer Science*); Professor and Chairman, Computer Centre, Indian Institute of Science, Bangalore-560012; Res. Duplex Quarters 20, IISc. Campus, Bangalore-560012; Tel.344192 (Off), 344411/Ext.488 (R); (S-IV, e. 1987)

+ RAMCHANDRAN, Arcot, (b.1923), Ph.D.(Purdue), Dr. Ing, D.Sc., F.N.A., F.A.Sc., (*Specialisation: Thermal Engineering and Heat Transfer*); Under Secretary General and Executive Director, UN Centre for Human Settlements (Habitat), Post Box 30030 Nairobi, Kenya; Tel.333930 (Off), 761553 (R); (S-III, e. 1987)

+ RAMACHANDRAN, S., (b.1934), Ph.D., (*Specialisation: Biotechnology, Biochemical Engineering*); Secretary to the Government of India, Deptt. of Bio-

Fellows

Service on
Council

technology, Ministry of Science and Technology, Block 2, 7th Floor, CGO Complex, Lodi Road, New Delhi-110003; Res: C1/10, Lodi Gardens, New Delhi 110003; Tel.362950 (Off), 619887 (R); (S-IX, e. 1987)

+ **RAMAMOORTHY, M.**, (b.1936), Ph.D.(Toronto), M.I.E.E.E., M.I.E., (*Specialisation: Power Apparatus and Systems*); Director General, Central Power Research Institute, P.O.Box No.1242, Bangalore-560012; Res: Director General's Quarters, C P R I Colony, New BEL Road, Bangalore-560012; Tel.331457 (Off), 331940 (R); (S-V, e.1988)

+ **RANGANATHAN, Srinivasa**, (b.1941), Ph.D.(Cantab), F.N.A., F.A.Sc., F.I.M, F.H.G., (*Specialisation: Physical Metallurgy and Materials Engineering*); Professor of Metallurgy, Indian Institute of Science, Bangalore-560012; Res: E-1, IISc Campus, C.V.Raman Avenue, Bangalore-560012; Tel.344411/Ext.558 (Off), 340521 (R); (S-VIII, e.1987)

+ **RANGA RAJU, Kittur Gundappa**, (b.1942), Ph.D., (*Specialisation: Hydraulics Engineering*); Professor, Department of Civil Engineering, University of Roorkee, Roorkee-247667; Res: 204/1, Saraswati Kunj, University of Roorkee-247667; (S-II, e.1988)

+ **RAO, B.V. Aswathanarayana**, (b.1933), Dr. Ing.(Dresden), (*Specialisation: Machine Dynamics, Industrial Tribology and Maintenance Engineering*); Professor, Department of Applied Mechanics, Indian Institute of Technology, Madras-600036; Res: B-9-9, Delhi Avenue, IIT Madras-600036; Tel.415265 (Off), 415923 (R); (S-II, e.1988)

+ **RAO, Ganti Prasad** (b.1942), Ph.D., F.I.E., S.M.I.E.E.E., (*Specialisation: Control Systems Engineering*); Professor, Department of Electrical Engineering, Indian Institute of Technology, Kharagpur-

Fellows

Service on
Council

721302 (WB); Res: Qrs. No. A-6, IIT Campus, Kharagpur-721302 (WB); (S-V, e.1988)

- + **RAO**, Gargeswari Nagarajanrao Venkataramana, (b.1934), Ph.D. F.I.E., (**Specialisation: Wind Engineering**); Professor, Department of Aerospace Engineering, Indian Institute of Science, Bangalore-560012, Res: 7, T P Venugopal Layout, Ganganagar, Bangalore-560032, Tel:344411/Extn. 417 (Off); (S-I, e.1989)

- + **RAO**, Jammi Srinivasa, (b.1939), Ph.D., D.Sc., (**Specialisation: Mechanical Engineering**); Professor, Department of Mechanical Engineering, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Tel 666979/Extn 293 (Off), 664078 (R), (S-III, e.1987)

- + **RAO**, Palte Rama, (b.1937), Ph.D., F.N.A., F.A.Sc., (**Specialisation: Physical and Mechanical Metallurgy**), Director, Defence Metallurgical Research Laboratory, P O Kanchanbagh, Hyderabad-500258; Tel.239233, 239365 (Off), 239080 (R); (S-VIII, e.1987)

- + **RAO**, Paranandi Venkata Suryanaryana, (b.1936), Ph.D., F.N.A., F.A.Sc., F.Ac.S.I., F.I.E.T.E.; S.M.I.E.E.E., (**Specialisation: Computer Science**); Professor and Head, Computer Systems and Communications Group, Tata Institute of Fundamental Research, Homi Bhabha Road, Bombay-400005; Res: 905, Bhaskara, T.I.F.R. Quarters, Bombay-400005; Tel.4952311/Ext.255(Off), 4952400 (R); (S-VI, e.1987)

RAO, Udipi Ramachandra, (b.1932), Ph.D., F.N.A., F.A.Sc., (**Specialisation: Space Sciences and Space Technology**); Chairman, Space Commission and Secretary, Department of Space, Government of India, Cauvery Bhawan, K.G.Road, Bangalore-560009; Res: 3367/E, 13th Main, HAL II Stage, Indiranagar, Bangalore-560038; Tel.77322, 27371 (Off), 572550 (R); (S-VII, e.1987)

Fellows

Service on
Council

- + **RODRIGUEZ**, Placid, (b.1940), Ph.D., F.I.M., (*Specialisation: Metallurgical Engineering*); Head, Metallurgy Programme and Materials Science Laboratory, Indira Gandhi Centre for Atomic Research, Kalpakkam-203102 (Tamil Nadu); Res: 7 Fifth Avenue, Kalpakkam-603102 (Tamil Nadu); (S-VII, e.1988)
- + **ROY**, Tuhin Kumar, (b.1923), Sc.D.(M.I.T), F.A.Sc., F.I.I.Ch.E(I), (*Specialisation: Hydrometallurgy, Fluidisation and Mixing*); Managing Director, Chemical and Metallurgical Design Company Limited, 511, Mansarova, 90, Nehru Place, New Delhi-110019; Tel.6431541, (Off), 6454205 (R); (S-IV, e.1987)
- + **SANYAL**, Gitindra Saran, (b.1922), M.Sc., D.R.R.E. (U.K.), F.N.A., Dist. F.I.E.T.E., (*Specialisation: Microwave Engineering*); Executive Director, STEP, Indian Institute of Technology Kharagpur-721302(WB); Res. Bungalow No. A-28, IIT Campus, Kharagpur 721 302 Tel.03222-221/ Extn. 8376 (Off), Extn 8272(R) (S-VI, e.1987) F. Secy
1987-89
- + **SEN**, Sankar Kumar, (b.1926), Ph.D., F.I.E., (*Specialisation: Electrical Machines*); Vice-Chancellor, Jadavpur University, Calcutta-700032; Res: W 3R-3/6. Phase VII, Golf Green, Calcutta-700045 Tel.721508 (Off), 725754 (R); (S-V, e.1987)
- + **SETHNA**, Homi Nusserwanji, (b.1923), M.S.E., M.Ch., F.N.A., F.A.Sc., F.I.E.; Member Royal Swedish Academy of Engineering; (*Specialisation: Chemical Engineering*); Formerly Chairman, Atomic Energy Commission & Principal Secretary to the AGovernment of India, Deptt. of Atomic Energy; Res: Panorama, 203, Walkeshwar Road, Malabar Hill, Bombay-400006; Tel.2041047, 2049131 (Off), 8121654, 828550 (R); (S-X, e.1987)
- + **SHENOY**, Ramadas Panemangalore, (b.1929), Ph.D., F.I.E.T.E., (*Specialisation: Radar Technology*); Distinguished Scientist, Defence Research and De-

Fellows

Service on
Council

velopment Organisation, Aeronautical Development Establishment, Bangalore-560093; Res: 115, 6th Main Road, Between 9th & 11th Cross, Malleswaram, Bangalore-560003; 360348 (Res) (S-VI, e.1988)

- **SINGH, Bharat**, (b.1925), Ph.D., F.I.E., (*Specialisation: Earth Dams, Hydraulic Structures*); Professor Emeritus, Water Resources Development Centre, University of Roorkee, Roorkee-247667; Res: 57/1, Civil Lines, Roorkee-247667; (S-II, e.1987)

1987-89
- **SINGH, Digvijai**, (b.1934), Ph D (Wisconsin), F.N.A., F.A.Sc., F.I.E., (*Specialisation: Dynamics of Mechanical Systems and Tribology*), Professor and Head, Department of Mechanical and Industrial Engineering, University of Roorkee, Roorkee-247667; Res: 104, Vigyankunj, University of Roorkee, Roorkee-247667, Tel 23491 / Ext.262 (Off), 2349/ Ext.263 (R); (S-III, e.1987)
- **SRINIVASAN, Malur R**, (b. 1930), Ph.D., F.I.E., (*Specialisation: Atomic Energy*); Chairman, Atomic Energy Commission, Government of India, Anushakti, Bhawan, CSM Marg, Bombay-400039 Res: 12-B, Zerlina, Little Gibbs Road, Malabar Hill, Bombay-400006 Tel. 2022543 (Off), 8223242 (R); (S-X, e.1987)
- **SUBBA RAO, Tippur Narayanarao**, (b.1928), D.Engg., F.I.E., F.I.S.(I), F.I.C.E.(UK), F.I.Str.E.(UK), (*Specialisation: Structural Engineering*); Managing Director, Gammon India Ltd., Gammon House, Veer Savarkar Marg, Prabha Devi, Bombay-400025; Res: 18/E, Dhanraj Mahal, C.M.S. Marg, Appolo Bunder Bombay-400039; Tel: 4306761, 4301084 (Off), 2023884 (R), (S-X, e.1988)
- **SUKHATME, Suhas Pandurang**, (b.1938), Sc.D.(MIT), F.A.Sc., (*Specialisation: Heat Transfer Solar Energy*); Professor, Department of Mechanical Engineering,

Fellows

Service on
Council

Indian Institute of Technology, Powai, Bombay-400076; Res: B-68, IIT Campus, Powai, Bombay-400076; Tel.581421, 586719 (Off), 581740 (R); (S-III, e.1987.)

- + **SUNDARESAN**, B.B., (b.1929), Ph.D.(Florida), F.I.E., (*Specialisation: Environmental Engineering*); Formerly Vice-Chancellor, University of Madras; Res: 76, First Avenue, Indira Nagar, Madras-600020; Tel.471199 (R) (S-IX, e.1987)

- + **SWANI**, Narinder Mohan, (b.1927), Ph.D., F.I.E., (*Specialisation: Textile Technology*); Formerly Director, IIT, New Delhi, Emeritus Fellow, Deptt. of Textile Technology, Indian Institute of Technology, Hauz Khas, New Delhi-110016; Res: 6 West Avenue, IIT Estate, Hauz Khas, New Delhi-110016; Tel.655903 (Off), 661283 (R); (S-IV, e.1987)

Hon. Treas.
1987-89

- + **TARAPORE**, Zal Sohrab, (b.1933), Ph.D.(Minnesota), (*Specialisation: Hydraulic and Sediment Transport*); Director Central Water and Power Research Station, Khadakwasala, Pune-411024; Res: 473/15-A/1, Salisbury Park, Pune-411001; Tel: 445652 (Off), 652239 (Res) (S-II, e.1988),

- + **TOSHNIWAL**, Govind Ram, (b.1904), D.Sc., F.N.A., F.N.A.Sc., Dist. F.I.E.T.E., S.M.I.E.E.E., (*Specialisation: Instrumentation*); Chairman, Toshniwal Industries Pvt. Ltd. Industrial Estate, Makhupura, Ajmer-305002; Res: 7, Kundan Nagar, Ajmer-305003; Tel.21071, 21271, 21371 (Off), 20456, 20727 (R); (S-X, e.1987)

V.P.
1987-89

- + **TYAGI**, Paritosh Chandra, (b.1932), M.E., F.I.E., (*Specialisation: Public Health Engineering*); Chairman, Central Pollution Control Board, Ministry of Environment & Forests, Government of India, Parivesh Bhavan, C.B.D.Cum-Office Complex, East Arjun

Fellows

Service on
Council

Nagar, Delhi-110092; Res: 1276, Sector 29, Noida (UP), 201303; Tel.2204948 (Off), 893871 (R); (S-IX, e.1987)

- + **VALIATHAN**, Marthanda Varma Sankaran, (b.1934), Ch.M., F.R.C.S., F.R.C.S.E., F.R.C.S.(Canada), F.N.A., F.A.Sc., F.A.C.C., F.A.M.S., (*Specialisation: Cardiac Surgery*); Director, Sri Chitra Tirunal Institute of Medical Sciences and Technology, Trivandrum-695001; Res: 6, Katakompally Scheme, Pulayannarkotta, Trivandrum-695011, Tel.73085 (Off), 8546 (R); (S-IX, e.1987)

- + **VARADARAJAN**, Srinivasan, (b.1928), Ph.D., F.N.A., F.A.Sc., (*Specialisation: Chemical Technology*); Chief Consultant, Planning Commission; Res: AB-13 Pandara Road, New Delhi-110003; Tel.385243 (Off), 381989 (R); (S-IV, e.1987)

1987-89

- + **VARSHNEY**, Rama Shankar, (b.1930), Ph.D., (*Specialisation: Hydraulic Structures and Foundations*); Secretary-General, International Commission on Irrigation and Drainage, 48, Nyaya Marg, Chanakyapuri, New Delhi-110021; Res: Siddhidatri, 8/127, Sector 3, Rajendra Nagar (Sahibabad), Ghaziabad-201005; Tel.3016837, 3015962, 3015679 (Off), 863632 (R); (S-II, e.1988)

- + **VISVESVARAYA**, Hosagrahar, C., (b.1928), Ph.D., F.I.E., (*Specialisation: Cement and Concrete Structures*); Chairman & Director General, National Council for Cement and Building Materials, M-10, South Extension-II, New Delhi-110049; Res: M-10/2, South Extension-II, New Delhi-110049; Tel.6449010, 6440590 (Off), 6448020 (R); (S-I, e.1987)

- + **VISWANADHAM**, Nukala, (b.1943), Ph.D., F.M.A., F.A.Sc., S.M.I.E.E.E., (*Specialisation: Control Theory and Manufacturing Automation*); Professor, Department of Computer Science and Automation, Indian Institute of Science, Bangalore-560012; Res:

Fellows

*Service on
Council*

121-A, K.H.B.C.S., Basavesware Nagar, Bangalore,
(S-V, e.1988)

+ WAHI , Satya Pal, (b.1929), B.Sc.(Engg.), F.I.E., F.B.I.M., (<i>Specialisation: Inter-disciplinary Engi- neering</i>); Chairman, Oil and Natural Gas Commis- sion, Tel Bhawan, Dehradun-248003 (UP), Res: Bun- galow No 1, Tel Bhavan, Dehra Dun-248003; Tel.24203, 27753 (Off), 23679, 24230 (R); (S-X, e.1987)	1987-89
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3. FOREIGN FELLOWSHIP 1989

Fellow

HUDSON, Donald E, (b.1916), Ph.D., (*Specialisation: Earthquake Engineering*); Professor Emeritus, Mechanical Engineering and Applied Mechanics, California Institute of Technology, Pasadena, California USA; (S-I, e.1987).

4. FELLOWSHIP - SECTIONWISE

SECTION - I

(Engineering Mechanics, Structural Engineering, Earthquake, Blast and Wind Engineering, Foundation Engineering and related Technologies, Architectural Engineering)

S.No	Name	Specialisation
1.	Alimchandani, C.R.	Architecture and Structural Design
2.	Ananthanarayana, N.	Engineering Mechanics, Earthquake Engineering, Wind Dynamics, Track train
3.	Arya, A.S.	Earthquake and Structural Engineering
4.	Bhandari, R.K.	Geotechnical Engineering
5.	Hudson, D.E.	Earthquake Engineering
6.	Iyengar, K.T.S.	Structural Engineering and Engineering Mechanics
7.	Kirshna, J.	Earthquake Engineering
8.	Kirshna, P.	Long Span Structures and Industrial Aerodynamics
9.	Mohan, D.	Soil Mechanics and Foundation Engineering
10.	Rao, G.N.V.	Wind Engineering
11.	Sirdharan, A.	Soil Mechanics and Foundation Engineering
12.	Visvesvaraya, H.C.	Cement and Concrete Structures

SECTION - II

(Fluid Mechanics, Hydrology, Water Resources, Water Supply Systems, Irrigation Engineering, River Engineering, Docks and Harbour Engineering)

S.No.	Name	Specialisation
1.	Chandra, S.	Hydrology and Water Resources
2.	Chitale, M.A.	Water Resources Engineering
3.	Framji, K.K.	Water Resources, Flood Control, Irrigation and Drainage
4.	Garde, R.J.	Fluvial Hydraulics, Fluid Mechanics
5.	Kulandaiswamy, V.C.	Hydraulics and Water Resources
6.	Narasimhan, S.	Fluid Mechanics, Water Resources Engineering, Coastal and Off-shore Engineering
7.	Padhye, M.G.	Water Resources Engineering
8.	Patel, C.C.	Water Resources Development
9.	Ranga Raju, K.G.	Fluvial Hydraulics
10.	Singh, B.	Earth Dams, Hydraulic Structures
11.	Tarapore, Z.S.	Hydraulics and Sediment Transport
12.	Varshney, R.S.	Hydraulic Structures and Foundation

SECTION - III

(Mechanical Engineering, Automobile Engineering, Agricultural Engineering, Robotics, Automation, Products Design and Production Engineering and Cyrogenic Engineering)

S.No.	Name	Specialisation
1.	Basu, S.K.	Production Engineering
2.	Bhattacharyya, A.	Production Engineering, Machine Tool Technology
3.	Chauhan, H.S.	Agricultural Engineering
4.	De, A.K.	Machine Tool Technology, Production Engineering, Nuclear Safety
5.	Michale, A.M.	Irrigation Water Management and Agricultural Engineering
6.	Munjal, M.L.	Technical Acoustics
7.	Nakra, B.C.	Vibrations Engineering
8.	Ramachandran, A.	Thermal Engineering, Heat Transfer
9.	Rao, B.V.A	Machine Dynamics, Industrial Tribology and Maintenance Engineering
10.	Rao, J.S.	Mechanical Engineering
11.	Singh, D.V.	Dynamics of Mechanical Systems and Tribology.
12.	Sukhatme, S.P.	Heat Transfer and Solar Energy.

SECTION - IV

(Chemical Engineering, Textile Engineering, Food Technology, Post Harvest Technology, Chemical Technologies including Paper Polymers, Rubber and Leather, Petroleum, Fertilizers, Pharmaceuticals etc.)

S.No.	Name	Specialisation
1.	Bose, A.N.	Food Technology and Aquacultural Engineering
2.	David, A.N.	Chemical Engineering
3.	Gowariker, V.R.	Solid Propellant, Fuel Technology, Polymers and Special Chemicals for Rockets and Space Applications
4.	Kumar, R.	Multiphase Phenomena
5.	Mashelkar, R.A.	Polymer Science and Engineering
6.	Mukherjea, R.N.	Biotechnology and Polymer Engineering
7.	Roy, T.K.	Hydrometallurgy, Fluidisation and Mixing
8.	Swani, N.M.	Textile Technology
9.	Varadarajan, S.	Chemical Technology

SECTION - V

(Electrical Engineering, Power System and Distribution,
Electrical Materials and Technologies)

S.No.	Name	Specialisation
1.	Choudhury, J.K.	Electrical Measurement and Instrumentation
2.	Jha, C.S.	Electrical Machines
3.	Nanda, J.	Electrical Power System Engineering
4.	Ramamoorthy, M.	Power Apparatus and Systems
5.	Rao, G.P	Control and Systems Engineering
6.	Sen, S.K.	Electrical Machines
7.	Viswanadham, N.	Control Theory and Manufacturing Automation

SECTION - VI

(Electronics, Telecommunications and Computer Science and Engineering, Telematics and Informatics)

S.No.	Name	Specialisation
1.	Bhat, B.	Microwave and Mm-Wave Engineering
2.	Bhattacharyya, A.B.	Microelectronics
3.	Bhiday, M.R.	Instrumentation, Educational Technology
4.	Das, B.N.	Antennas and Microwave Engineering
5.	Dutta Majumder, D.K.	Pattern Recognition, Computers Communication and Control Science
6.	Dutta Roy, S.C.	Circuits, Systems and Signal Processing
7.	Indiresan, P.V.	Communication Engineering
8.	Mitra, S.N.	Electronics and Telecommunication Engineering
9.	Nag, B.R.	Solid State Electronics
10.	Rajaraman, V.	Computer Science
11.	Rao, P.V.S.	Computer Science
12.	Sanyal, G.S.	Microwave Engineering
13.	Shenoy, R.P.	Radar Technology

SECTION - VII

(Marine and Ocean Engineering, Transport Engineering,
Aerospace Engineering, Space Technology, Rocket
and Missile Technologies)

S.No.	Name	Specialisation
1.	Dhir, M.P.	Highway Engineering
2.	Gupta, S.C.	Control and Instrumentation Engineering for Space
3.	Jain, R.K.	Railway and Transport Engineering
4.	Kalam, A.P.J.A.	Space and Missile Technology
5.	Khanna, S.K.	Transportation Engineering
6.	Murthy, P.N.	Aerospace Engineering
7.	Narasimha, R.	Fluid Mechanics, Aeorspace Engi- neering and Atmospheric Sciences
8.	Nigam, N.C.	Structural Mechanics and Aero- space Engineering
9.	Rao, U.R.	Space Science and Technology

SECTION - VIII

(Metallurgical Engineering, Material Science and Engineering,
Mining and Geological Engineering)

S.No.	Name	Specialisation
1.	Anantharaman, T.R.	Physical Metallurgy and Materials Technology
2.	Antia, D.P.	Metallurgical Engineering and Industrial Management
3.	Arunachalam, V.S.	Physical, Mechanical and Power Metallurgy
4.	Chopra, K.L.	Solid State Physics, Thin Film Technology and Surface Science
5.	Ghose, A.K.	Rock Mechanics and Rock Excavation Engineering
6.	Krishnan, R.	Physical Metallurgy and Material Science
7.	Rama Rao, P.	Physical and Mechanical Metallurgy
8.	Ranganathan, S.	Physical Metallurgy and Materials Science
9.	Rodriguez, P.	Metallurgy and Materials Science

SECTION - IX

(Bio-technology, Bio-Engineering, Environmental Engineering,
Non-Conventional Energy Engineering)

S.No.	Name	Specialisation
1.	Ghose, T.K.	Biochemical Engineering
2.	Guha, S.K.	Biomedical Engineering
3.	Khanna, P.	Environmental Engineering
4.	Ramachandran, S.	Biotechnology
5.	Sundaresan, B.B.	Environmental Engineering
6.	Tyagi, P.C.	Public Health Engineering
7.	Valiathan, M.V.S.	Cardiac Surgery

SECTION - X

(Specialised and Inter-disciplinary Engineering, Reliability Engineering, Construction Technologies, Remote Sensing and Engineering Surveys, Educational Technology and Industrial Engineering)

S.No.	Name	Specialisation
1.	Chandra, A.	Electronics, Materials Science, Educational Technology and Management
2.	Dogra, R.N.	Structural Engineering, Educational Management
3.	Pal, Y.	High Energy Physics and Astrophysics, Science Policy and Space Technology
4.	Sethna, H.N.	Chemical Engineering
5.	Srinivasan, M.R.	Atomic Energy
6.	Subba Rao, T.N.	Structural Engineering
7.	Toshniwal, G.R.	Instrumentation
8.	Wahi, S.P.	Inter-disciplinary Engineering

5. SECTIONAL COMMITTEES (SC)

SC-I

K.T.S. Iyengar (*Convener*)
H.C. Visvesvaraya
C.R. Alimchandani
A.S. Arya
R.K. Jain
P. Krishna
B. Singh

SC-II

B. Singh (*Convener*)
M.A. Chitale
S. Chandra
K.K. Framji
V.C. Kulandaiswamy

SC-III

A.M. Michael (*Convener*)
A. Bhattacharyya
A.K. De
M.L. Munjal
D.V. Singh
S.P. Sukhatme

SC-IV

S. Varadarajan (*Convener*)
N.M. Swani
A.N. Bose
V.R. Gowariker
R. Kumar
R.A. Mashelkar

SC-V

C.S. Jha (*Convener*)
J.K. Choudhury
G.S. Sanyal
S.K. Sen

SC-VI

G.S. Sanyal (*Convener*)
S.C. Dutta Roy
B. Bhat
S.N. Mitra
V. Rajaraman
P.V.S. Rao

SECTIONAL COMMITTEES (SC)

SC-VII

R.K. Jain (*Convener*)

N.C. Nigam

A.P.J.A. Kalam

S.K. Khanna

R. Narasimha

U.R. Rao

SC-VIII

V.S. Arunachalam (*Convener*)

P. Rama Rao

K.L. Chopra

A.K. Ghose

R.A. Mashelkar

S. Ranganathan

SC-IX

S. Ramachandran (*Convener*)

P.C. Tyagi

T.K. Ghose

P. Khanna

B.B. Sundaresan

SC-X

G.R. Toshniwal (*Convener*)

A. Bhattacharyya

C.R. Alimchandani

S.K. Basu

A. Chandra

Y. Pal

6. MEMORANDUM OF ASSOCIATION

NAME OF THE SOCIETY

1. The name of the Society shall be 'INDIAN NATIONAL ACADEMY OF ENGINEERING'

REGISTERED OFFICE

2. The registered office of the Academy shall remain in the Union Territory of Delhi and at present is at the following address:

C/O The Institution of Engineers (India)
Bahadur Shah Zafar Marg,
New Delhi-100002.

AIMS AND OBJECTS

3. The aims and objects for which the Indian National Academy of Engineering (hereinafter called 'The Academy') is hereby constituted are to promote the general advancement of engineering and technology and the related sciences and disciplines and to facilitate and exchange of information of ideas on these subjects amongst the Members of, and persons attached to, the Academy and otherwise, and for that purpose-

- (a) To promote and advance the practice of engineering and technology and the related sciences and disciplines (hereinafter referred to as 'Engineering') in India and their application to problems of national importance.
- (b) To disseminate among its members information on all matters pertaining to 'Engineering' and to encourage, assist and extend knowledge and information connected therewith by publishing such proceedings, journals, memoirs and other publications as may be desirable and hold meetings, lectures, seminars, symposia etc.
- (c) To interact, after due and detailed consideration, with professional bodies, engineering and scientific academies

etc. already established or as may be established in future in India and abroad.

- (d) To promote and safeguard academic and professional interest of persons involved in 'Engineering' (hereinafter referred to as 'Engineer') in India by laying down a code of ethics which shall be an obligation to be signed by all Fellows of the Academy on admission thereto.
- (e) To provide an association of eminent 'Engineers' and to present at all academic forums, research and developmental activities on 'Engineering' on mutually interactive and cooperative basis, both in India and abroad.
- (f) To promote the National Policy on Education of the Government of India as announced from time to time, in all matters of technical education where the Academy is concerned.
- (g) To assist the Government of India, the Local Governments, All India Council of Technical Education and others in analysing, forecasting for the purpose of planning and formulating the policies in respect of education in 'Engineering', and ensuring the appropriate standard thereof.
- (h) To offer the Government of India, the local governments and others facilities for conferring with and ascertaining the views of 'Engineers' as regards matters directly or indirectly pertaining to 'Engineering' and to confer with the said Governments and others in cooperation with other fraternal professional bodies in regard to all matters pertaining to 'Engineering'.
- (i) To encourage inventions, investigations and research and promote their applications for development of both organised and unorganised sectors of the national economy.
- (j) To encourage and promote the pursuit of excellence in the field of 'Engineering'.
- (k) To institute and establish Professorships, Fellowships, Studentships, Scholarships, Rewards and other benefac-

tions and to grant Certificates of Competency and Charter whether under any Act of Government of India or otherwise howsoever.

- (l) To do all such other acts and things as are incidental or conducive to the attainment of the above objects or any one of them.

4. All the incomes, earnings, movable or immovable properties of the Academy shall be solely utilised and applied towards the promotion of its aims and objects only as set forth in the Memorandum of Association and no portion thereof shall be paid or transferred directly or indirectly by way of dividends, bonus, profits or in any manner whatsoever, to the present or past members of the Society or to any person claiming through any one or more of the present or the past members. No member of the Academy shall have any personal claim on any movable or immovable properties of the Academy or make any profits, whatsoever, by virtue of this membership.

GOVERNING COUNCIL

5. The names, addresses, occupation and designation of the present members of the governing council to whom the management of the Academy is entrusted as required under Section 2 of the Societies Registration Act, 1860, as applicable to the Union Territory of Delhi are as follows:-

S. No.	Name (full in capital)	Address	Occupation	Designation in the Society
1.	Prof. Jai Krishna	61 Civil Lines, Roorkee.	Prof. Emeritus Roorkee University	President
2.	Dr. V.S. Aruna chalam	Ministry of Defence, South Block, New Delhi-11.	Scientific Adviser to Minister of Defence	Vice- President

S. No.	Name (full in capital)	Address	Occupation	Designation in the Society
3.	Dr. G.R. Toshniwal	Toshniwal Industries Pvt. Limited 7, Kundan Nagar, Ajmer (Rajasthan)	Chairman	Vice-President
4.	Prof. S.N. Mitra	Toshniwal Bros. (Delhi) Pvt. Ltd. 3-E/8, Jhadewalan, Extn., New Delhi-55.	Technical Director	Honorary Secretary
5.	Prof. A.B. Bhattacharyya	IIT, Hauz Khas, New Delhi.	Head, CARE	Honorary Treasurer
6.	Prof. G.S. Sanyal	IIT, Kharagpur	Director	Foreign Secretary

DESIROUS PERSONS

6. We, the undersigned, are desirous of forming a Society, namely, "Indian National Academy of Engineering" under the Societies Registration Act, 1860 as applicable to the Union Territory of Delhi in pursuance of this Memorandum of Association of the Academy.

S.No.	Name	Address	Occupation	Signature
1.	Prof. Jai Krishna	61 Civil Lines Roorkee	Prof. Emeritus Roorkee University	Sd/-
2.	Dr. V.S. Arunachalam	Ministry of Defence South block New Delhi-11	Scientific Adviser to Minister of Defence.	
3.	Dr. G.R. Toshniwal	Toshniwal Inds. Pvt. Ltd. 7, Kundan Nagar, Ajmer (Raj.)	Chairman	

S.No.	Name	Address	Occupation	Signature
4.	Prof. S.N. Mitra	Toshniwal Bros (Delhi) Pvt. Ltd. 3E/8, Jhandewalan Extn., New Delhi-55	Technical Director	
5.	Prof. A.B. Bhattacharyya	IIT, Hauz Khas New Delhi	Head, CARE	
6.	Prof. G.S. Sanyal	IIT, Kharagpur	Director	
7.	Prof. Ashoka Chandra	Department of Education, Ministry of HRD Shastri Bhawan, New Delhi	Educational Adviser(Tech.)	
8.	Dr Bharat Singh	Roorkee University Roorkee	Vice-Chancellor	
9.	Prof. A Bhattacharyya	Jadavpur University Calcutta-32	Service	
10.	Dr. A.M. Michael	Indian Agricultural Research Institute, New Delhi	Director	
11.	Prof. B.R. Nag	Institute of Radio Physics & Electronics 92, Acharya, P.C.Road Calcutta-9	Professor	
12.	Prof. N.M. Swani	IIT, Hauz Khas New Delhi-16	Director	
13.	Dr. S. Varadarajan	Planning Commission New Delhi	Chief Consultant	
14.	Col. S.P. Wahi	ONGC Tel Bhawan Dehradun, U.P.	Chairman	

Signatures of persons 1-14 above are hereby attested.

7. RULES AND REGULATIONS

INTERPRETATION

1. In these Rules and Regulations, unless the context otherwise requires, expressions shall have the same meaning as in the Memorandum of Association, words importing males shall include females and words implying the singular number shall include the plural number and vice versa and words importing individual person or persons shall include body or bodies corporate. Furthermore,
 - i) "The Academy" means Indian National Academy of Engineering registered under the Societies Registration Act 1860.
 - ii) "The Memorandum" means the Memorandum of Association of the Academy dated **20 April 1987**.
 - iii) "The Rules and Regulations" means the Rules and Regulations of the Academy for the time being in force.
 - iv) "The Governing Council" means the Council of the Academy constituted under these Rules and Regulations.
 - v) "The President" means the President of the Academy.
 - vi) "The Honorary Secretary" means the Honorary Secretary of the Academy as may be elected* by the Council from time to time.
 - vii) "The Foreign Secretary" means the Foreign Secretary of the Academy as may be elected* by the Council from time to time.
 - viii) "The Executive Secretary" means the Executive Secretary of the Academy as may be appointed by the Council from time to time.
 - ix) "The Honorary Treasurer" means the Honorary Treasurer of the Academy as may be elected* by the Council from time to time.

*Approved by Special General Meeting of Fellows on 14th April 1989

- x) "The Editor of Publications" means the Editor of Publications of the Academy as may be elected* by the Council from time to time.
- xi) "Financial Year" means the twelve months commencing on the first day of April * of a year and ending with the last day of March* of the following year.
- xii) "Session" means the period of time between the date of one Annual General Meeting and the date of the succeeding Annual General Meeting.
- xiii) "The Roll" means the register of members of the Academy.
- xiv) "The Recorded Address" means the address of a member as given in the proposal for his election or subsequently changed by notice in writing to the Executive Secretary and as recorded in the Roll.

MANAGEMENT

- 2. (a) The management and control of the Academy and its affairs shall vest with its Council and the Council shall exercise all the powers of the Academy and do all duties of the Academy with intent to give effect to the provisions of the Articles in the Memorandum of Association and the Rules and Regulations for the time being of the Academy except so far as the same are by the Articles or by the Rules and Regulations for the time being expressly required to be done in general meetings of the Fellows or by the President or the Executive Secretary of the Academy.
- (b) All the powers of the Academy shall be vested in and exercisable by the Council except in so far as the same are by these Presents or by the Rules and Regulations for the time being of the Academy expressly required to be exercised by the Academy in a general meeting.

- (c) The meetings of the Academy shall be of such classes and shall be held for such purposes as may from time to time be prescribed by the Rules and Regulations of the Academy and the rights of the several classes of members and of persons attached to the Academy for attending and voting at the said meetings shall be such or subject to such restrictions as may be so prescribed.
- (d) The Academy, through the Council, shall act through properly constituted national committees in which All India Council of Technical Education, other learned societies and academies will be associated for undertaking such scientific, technical and developmental activities of national and international importance as the Academy may be called upon by the public and the Government to perform.

THE GOVERNING COUNCIL

- 3. (a) There shall be a Council of the Academy consisting of such number of Members, with such qualifications, and to be elected and constituted as such Members of the Council in such manner and to hold office for such a period, and on such terms as to re-election and otherwise, as the Rules and Regulations for the time being direct.
- (b) The Council shall consist of 29* members as indicated below:
 - i) The President
 - ii) Two Vice-Presidents
 - iii) *One Immediate Past-President
 - iv) *Honorary Secretary
 - v) *One fellow to be elected from amongst themselves, by each of the respective Sections
 - vi) One Engineer Fellow to be nominated by each of the Indian National Science Academy, the Asiatic Society, the Indian Academy of Sciences, the National

Academy of Sciences (India), the Indian Science Congress Association and the *Indian Engineering Congress

- vii) One person to be nominated by the *nodal Ministry of the Government of India
 - viii) The Educational Adviser (Tech) of the Government of India
 - ix) A representative of All India Council of Technical Education to be nominated by the Chairman* from amongst the Fellows of the Academy, and
 - x) * One Fellow each of the Academy nominated by the Institution of Electronics and Telecommunication Engineers and the Institution of Engineers(India) and four Fellows of the Academy belonging to recognised professional societies in India to be selected by the Council of Academy as per Ordinances framed by it from time to time.
- (c) No act of the Council or any body set up under Rules and Regulations of the Council shall be invalid merely by reason of:
- i) Any vacancy in or defect in the constitution thereof.
 - ii) Any defect in the election, nomination or appointment of a person acting as a member thereof.

4. * Unless and until the Rules and Regulations for the time being of the Academy shall otherwise direct, the Council at their last meeting prior to the Annual General Meeting of the Academy in alternate years shall elect from amongst themselves who are Fellows of the Academy a President, the Vice-Presidents and the Honorary Secretary. The President, the Vice-Presidents and the Honorary Secretary so elected shall enter into office at the ensuing Annual General Meeting of the Academy. Provided further that such persons falling under the Rules and Regulations 3(b), (v), (vi), (vii), (viii), (ix) and (x) shall also enter into office as those elected at the ensuing Annual General Meeting of the Academy.

DUTIES AND RESPONSIBILITIES OF THE OFFICE BEARERS

5. President

- (a) To preside at all the meetings of the Academy and of the Council and to regulate the proceedings at such meetings.
- (b) To ensure that due effect is given to the Rules and Regulations and to the Ordinances* made by the Council.
- (c) To be ex-officio member of all Committees appointed by the Council.
- (d) In case of doubt as to the interpretation of the Rules and Regulations* he will decide on the interpretation. In such case the President's interpretation shall hold until the next meeting of the Council, when the interpretation of the Rule will be discussed to be finally determined.
- (e) * In the event of the President being unable to perform the duties of his office due to death, resignation or any other cause or in the case of his prolonged absence from India for any reason, the senior Vice-President, shall assume the duties of the President till the Council elects a President from amongst themselves in accordance with the provisions of the Rules and Regulations 11(a) for the residual part of the session, provided such residual part is not less than two months.

* The seniority of the Vice-Presidents shall be based upon on the continuous number of years that the Vice-Presidents concerned have been on the roll as Fellow. If both the Vice-Presidents have entered the Academy on the same date, the age will determine their seniority.
- (f) * In case of an emergent situation requiring urgent action on matters pertaining to the functions of the Academy, the President may take such decisions as he thinks fit on behalf of the Council and report the same at the next meeting of the Council for its approval.

Vice Presidents

6. a) * To perform the duties as may be defined by the President from time to time.
- b) * In the event of the Vice-President being unable to perform the duties of his office due to death, resignation or any other cause, or in the case of his prolonged absence from India for any reason the other Vice-President shall resume the duties of the vacating Vice-President till the Council elects a Vice-President from amongst themselves in accordance with the provision of the Rules and Regulations 11(a) for the residual part of the session provided such residual part is not less than two months.

7. Honorary Secretary

- (a) To conduct the correspondence of the Academy and of the Council and to sign all letters and papers emanating from the Academy, except in so far as another provision is made in these Rules and Regulations. *
- (b) At the general meeting to announce the presents made to the Academy since their last meeting.
- (c) To read the names of candidates for Fellowships, original papers communicated and the letters addressed to the Academy.
- (d) To prepare for submission to the General Meeting, a list of Fellows corrected upto date.
- (e) To enter or cause to be entered in the Minute-Books all the proceedings of the Academy and the Council before the following meeting, and to see that all letters and papers and documents of every kind connected with the business of the Academy are properly filed and preserved.
- (f) To exercise general supervision over the staff and the affairs of the Academy and to assist in carrying out the Rules and Regulations and Orders made by the Council;

- (g) To be ex-officio member of the Committees appointed by the Council from time to time, except any specific Committees, as directed by the Council specifically.
- (h) * In the event of the Honorary Secretary being unable to perform the duties of his office due to death, resignation or any other cause, or in the case of his prolonged absence from India for any reason, the Council shall elect an Honorary Secretary from amongst themselves in accordance with the provisions of the Rules and Regulations 11(b) for the residual part of the session provided such residual part is not less than two months.

8. Foreign Secretary

The duty of the Foreign Secretary shall be to conduct correspondence with foreign countries, relating to the business of the Academy, to return thanks for presents from foreigners made to the Academy, and to forward to persons elected as Foreign Fellows, a certificate, certifying their election to the Academy.

9. Honorary Treasurer

- (a) The Honorary Treasurer shall receive and hold for the use of the Academy all money paid to the Academy. He shall disburse all sums due from the Academy and shall keep exact accounts of all such receipts and payments.
- (b) The Honorary Treasurer shall be the ex-officio member of all the Committees appointed by the Council from time to time except any specific Committees as directed by the Council specifically.
- (c) At the expiration of every half year, the Honorary Treasurer shall prepare a list of names of those Fellows, who may be in arrears for subscriptions for six or more months, and shall submit it for orders of the council at the next Council Meeting.

10. Editor of Publications

The Editor shall be responsible for the preparation and printing of the publications of the Academy and shall have the right of direct correspondence with the authors and with the Press.

Terms of Council

11. a) * The term of the President and the Vice-Presidents shall be for two sessions only. They shall retire at the Annual General Meeting of Fellows and Foreign Fellows after completion of the period of office (two sessions) and shall not be eligible for re-election.
 - b) * The terms of office of the Honorary Secretary shall be for two sessions and he shall be eligible for re-election for further two sessions.
 - c) * The term of elected members of the Council shall be for two sessions
 - d) * The term of the persons nominated by Indian National Science Academy, Asiatic Society, Indian Academy of Sciences, National Academy of Sciences, (India), Indian Science Congress Association, Indian Engineering Congress, the nodal Ministry of the Government of India, the All-India Council for Technical Education and Professional Societies in India shall be for two sessions.
12. * Casual vacancy amongst the elected members of the Council may be filled by the Council with the Fellow from the same Section. He shall retain his membership of the Council, so long only as the vacating member of the Council, would in the ordinary course, have retained membership and any period of membership so served shall not be taken into account in computing the period of membership under the provisions of Rules and Regulations 11(c).

POWERS, PROCEDURES, DUTIES OF THE COUNCIL

13. The Council shall direct and manage the affairs and property of the Academy, subject to the provisions of the Articles, the Rules and Regulations and the Resolutions of General Meetings of the Fellows and Foreign Fellows which have been duly summoned and held in accordance with the Rules and Regulations and duly recorded in the minutes of the meetings. Subject to as aforesaid, the Council shall further exercise all powers of the Academy not otherwise specifically provided for; provided such powers are not by the Articles or the Rules and Regulations, required to be exercised by the Fellows and Foreign Fellows at a General Meeting.
14. The decisions of the Council on all matters dealt with by it in accordance with the provisions in the Articles and Rules and Regulations and such resolutions of General Meetings of Fellows and Foreign Fellows as aforesaid shall be final and binding on all classes of members.
15. * The Council shall, at its first meeting immediately after the Annual General Meeting shall elect one Foreign Secretary, one Honorary Treasurer and one Editor of Publications from amongst its members and shall specify their respective duties and powers.
16. The Council may appoint Committee or Committees and may delegate any of its powers to any such Committees. The Council may, in addition, delegate any of its powers to the President, the Executive Secretary or such other person or persons or bodies as it may appoint or constitute from time to time for efficient working of the Academy. All such Committees or persons shall be in the exercise of powers delegated to them by the Council and in the transaction of business conform to any directions that may be given to them by the Council and subject thereto may regulate their proceedings as they think fit.
17. The Council shall meet as often as the business of the Academy may require, but not less than three times a year. At

every meeting of the Council one third of the total strength of the Council shall constitute a quorum. A meeting of the Council at which a quorum is present shall be competent to exercise all or any of the powers or discretions vested in or exercisable by the Council, notwithstanding any vacancy in the body. If at any meeting there is no quorum, the meeting shall stand adjourned for one hour and shall meet at the same place on expiry of one hour and transact the business of the meeting, with members present at the quorum.

18. To summon a meeting of the Council, the Executive Secretary shall issue a notice of meeting to each member of the Council together with the agenda not less than twenty one days before the date of meeting. This period of twenty one days shall be exclusive of the day on which the notice is issued, but inclusive of the day for which the notice is given. This period shall not apply to supplementary agenda which may be issued as the exigencies of the case may require.
19. The Executive Secretary shall summon a special meeting of the Council on receipt of a written requisition which shall contain a specific matter desired to be discussed at this special meeting and shall be signed by atleast fifteen members of the Council and within thirty days of the receipt of the requisition. The notice of such special meeting shall state the purpose for which the meeting is called and its period shall be the same as Rules and Regulations 18. At the such meeting no business other than specified in the requisition shall be transacted.
20. At any meeting of the Council, each member of the Council present in person shall have one vote. All questions shall be decided in the Council by a majority of those persons having a right to vote. In the case of equality the President or other person presiding shall have a second or a casting vote. A postal vote of the Council shall, however, be taken whenever,
 - (a) Any six present in person at the meeting shall demand it, or
 - (b) Any fifteen whether present at the meeting or not, shall by notice in writing delivered to the Executive Secretary before the hour fixed for the meeting, demand it, or

(c) The meeting of the Council shall so direct.

21. The Council shall cause a statement of the funds of the Academy and of the income and expenditure during the past year, terminating on the last day of the month of March* to be made and verified and signed by the Auditors. The Council shall cause such accounts to be presented at the Annual General Meeting.
22. The Council shall draw up an Annual Report of the Council on the state of the Academy, and shall present it at the Annual General Meeting.
23. The Council may make, amend or rescind Rules and Regulations provided that the same may not be repugnant to the Memorandum of Association and no such addition, amendment or rescission shall come into operation until the same has been approved by a Special General Meeting of Fellows and Foreign Fellows.
24. The Council may call for an Extraordinary General Meeting of the Fellows and Foreign Fellows of the Academy for any specific purpose relating to the directions and management of the affairs of the Academy except for revoking, altering or amending any of the provisions of the Rules and Regulations of the Academy.

THE EXECUTIVE SECRETARY

25. The Executive Secretary of the Academy shall be appointed by the Council at such remuneration and at such other terms as it may think fit.
26. (a) The Executive Secretary shall carry out all his duties under the direction of the Council. He shall, unless exempted from the provisions hereof by the Council, devote his whole time to the business of the Academy and shall not engage in any other business or profession. He shall be in administrative charge of all the employees at the Headquarters and other offices of the Academy as may be established from time to time.

- (b) He shall be responsible for the conduct of all correspondence and office work of the Academy; he shall maintain Roll of all classes of members and of their addresses; he shall attend all meetings of the Council and shall have the business transacted thereat correctly and fully recorded; he shall superintend the publications of the Academy; he shall have charge of the libraries of the Academy; he shall have charge of all the properties of the Academy save only the funds and moneys in the custody of the Bankers; he shall engage, subject to the approval of the Council, all persons employed under him and arrange their work and duties, and he shall generally conduct the ordinary business of the Academy in accordance with the Articles, the Rules and Regulations and the directions of the Council, and shall refer to the President in any matters of importance requiring urgent decision.
- (c) The powers of the Executive Secretary shall be generally defined by the Council from time to time.

GENERAL MEETINGS

- 27. The General Meetings of the Fellows and Foreign Fellows shall be of the following classes:
 - (a) The Annual General Meeting of Fellows and Foreign Fellows only for the business prescribed in the Rules and Regulations 28 (a).
 - (b) Special General Meeting of Fellows and Foreign Fellows for the purpose of:
 - i) Considering addition, amendment, rescission of the Rules and Regulations.
 - ii) Considering any resolution duly passed by the Council other than those in respect of addition, amendment or rescission of Rules and Regulations and requiring the confirmation of the Fellows and Foreign Fellows; and

- iii) Considering the specific matters to be moved at such Special General Meeting pursuant to any requisition signed by not less than twenty Fellows and submitted to the Executive Secretary.

- (c) Extraordinary General Meeting of Fellows and Foreign Fellows for any specific purpose relating to the directions and management of the affairs of the Academy.

28. (a) i) The Annual General Meeting of the Fellows and the Foreign Fellows shall be held at such place as the Council shall determine, but not later than last day of the month of October* every year. But if not held due to unavoidable reasons, the Council shall have the power to hold the Annual General Meeting in any other month, and the reasons for the postponement shall be announced at the Annual General Meeting.

- ii) The business of the Annual General Meeting shall be to receive the Audited Accounts of the Academy, and the Annual Report of the Council for preceding financial year, and report on the composition of the Council and to appoint Auditors and fix their remuneration.

- iii) List of the Council members shall be furnished annually to the office of the Registrar under Section 4 of the Societies Registration Act 1860.

- (b) i) A Special General Meeting of the Fellows and Foreign Fellows may be called at any time by the Council at such place as the Council may decide for the purpose.

- ii) The Council shall also be bound to call a Special General Meeting whenever a requisition signed by at least twenty Fellows is made and delivered to the Executive Secretary, specifying the matter to be moved at such Special General Meeting to be issued within ninety days of the receipt of the requisition by the Executive Secretary. At such Special General Meeting only the special matters of which notice has been given or such questions as necessarily arise thereof shall be considered.

- (c) i) An Extraordinary General Meeting of Fellows and Foreign Fellows may be called at any time by the Council at such place as the Council may decide for the purpose.
 - ii) The Council shall also be bound to call an Extraordinary General Meeting whenever a requisition signed by at least twenty Fellows is made and delivered to the Executive Secretary, specifying the matter to be moved at such an Extraordinary General Meeting to be issued, within ninety days of the receipt of the requisition by the Executive Secretary.
29. Notice of the making, amending or rescinding of any Rules and Regulations shall be published in an appropriate way as soon as it is reasonably practicable after the same shall have been passed in accordance with the provisions of the Articles and the Rules and Regulations.
30. At least twenty-five days notice shall be given of all General Meetings. This period of twenty-five days shall be inclusive of the day for which the notice is given. In the case of a Special General Meeting and an Extraordinary General Meeting the instrument for appointing proxy shall accompany the notice as described in Rules and Regulations 31*
31. Service of a notice shall be deemed to be effected by properly addressing, pre-paying and posting the letter containing the notice. The accidental omission to give notice of a General Meeting to or the non-receipt of notice of such a meeting by any Fellow and Foreign Fellows entitled to receive notice shall not invalidate the proceedings of that meeting.

PROCEEDINGS OF GENERAL MEETING

32. The President, when present, shall be the Chairman at all General Meetings. In his absence one of the Vice-Presidents shall be Chairman at the meeting. If the President and both the Vice-Presidents are absent, the Fellows and Foreign Fellows present at the meeting shall elect a Chairman from amongst themselves.

33. No business shall be transacted at General Meeting unless a quorum is present when the meeting proceeds to business. Twenty Fellows and Foreign Fellows present shall be quorum for the Annual General Meeting, thirty Fellows and Foreign Fellows for a Special General Meeting, and thirty Fellows and Foreign Fellows for an Extraordinary General Meeting.
34. If within thirty minutes after the time appointed for the Annual General Meeting, a Special General Meeting or an Extraordinary General Meeting, or at any point of time during the Annual General Meeting, a Special General Meeting or an Extraordinary General Meeting, the requisite quorum is not present, the meeting shall be dissolved and the Chairman with the consent of the meeting, and if so directed by the meeting, shall adjourn the meeting by one hour. The adjourned meeting shall be held at the same place on expiry of one hour and the Fellows present at the adjourned meeting shall form the quorum. No business shall be transacted at any adjourned meeting other than the business left unfinished at the meeting from which adjournment took place. It shall not be necessary to give any notice of an adjournment or of the business to be transacted at an adjourned meeting.
35. (a) The members or the majority of such members present in person or by proxy and voting at any duly convened General Meeting of the Members with respect to which notice shall have been given of the matters to be taken into consideration thereat, shall have power, from time to time, to make such Rules and Regulations of the Academy as to them shall seem requisite and convenient for regulating, governing and advantage of the Academy and of its members and property and for the furtherance of the aims and objects of the Academy, and from time to time to revoke, alter or amend any Rules and Regulations theretofore made so that the same shall be reasonable and not repugnant to these Presents or to the Laws and Statutes of the Republic of India.

(b) At all General Meetings of Fellows and Foreign Fellows,

questions shall be decided according to the majority of votes properly given thereat by show of hand:

- i) Unless a poll is, before or on the declaration of the results by the show of hands, demanded by atleast ten Fellows and/or Foreign Fellows present provided no poll shall be demanded on the election of a Chairman or on a question of adjournment, and
 - ii) Unless instruments of proxy have been deposited with the Executive Secretary in accordance with the provision Rules and Regulations 37 in which case due account shall be taken of them.
 - (c) In case of an equality of votes the Chairman of the meeting shall, both on a show of hands and at a poll, have a casting vote. The acceptance or rejection of votes by the Chairman shall be conclusive for the purpose of the decision of the matter in respect of which the votes are tendered.
36. Votes may be given at a General Meeting of Fellows and Foreign Fellows either personally or by proxy. Each fellow present in person or by proxy shall have one vote. No person shall be appointed a proxy to vote at any meeting who is not a Fellow or a Foreign Fellow entitled in his own right to vote at such a meeting.
37. The instrument appointing a proxy shall be deposited with the Executive Secretary not less than three days before the hour fixed for the meeting at which the person named in the proxy proposes to vote, but no instrument appointing a proxy shall be valid after expiration of three calendar months from its date.
38. A poll shall be taken by means of postal voting papers and shall be a poll of all Fellows and Foreign Fellows who at the time of despatch of such papers shall be entitled to receive notice of a meeting:
- (a) When Fellows and Foreign Fellows demand it under the provisions of Rules and Regulations 35(b) (i); and

- (b) When in its opinion, the Council considers it in the interest of the Academy that an appeal should be made on any question to the whole body of Fellows and Foreign Fellows.

The form and contents of the voting papers shall specify the subject matter to be voted upon and the date of return thereof, and shall be issued at least thirty days, exclusive of the day on which the papers are deemed to be issued, but inclusive of the day of return, prior to the date of return.

MEMBERSHIP

- 39. Unless and until the Rules and Regulations of the Academy shall otherwise provide, there shall be two classes of members of the Academy termed respectively as Fellows and Foreign Fellows.

The names and addresses of all members shall be entered on the Roll of the Academy.

QUALIFICATIONS FOR MEMBERSHIP

- 40.
 - (a) The qualifications, method and terms of admission, privileges and obligations including liability to exclusion or suspension of Members of each of the said two classes shall be such as the Rules and Regulations for the time being of the Academy shall direct.
 - (b) The Council shall alone have power to decide conclusively in respect of each person proposed for or seeking admission to any class of membership of the Academy whether he has or has not fulfilled such conditions as are applicable to his case.
 - (c) Fellow and Foreign Fellow of the Academy shall be entitled to the exclusive use after his name of the abbreviated designation 'FNAE'.
 - (d) The Academy shall elect Fellows and Foreign Fellows in different disciplines of Engineering in accordance with

the provisions of Rules and Regulations 40 (e) and (f) on the basis of merit, achievements and contributions of the individuals nominated for election.

- (e) Every person for election as a Fellow or a Foreign Fellow shall satisfy the Council that he is engaged in the profession of engineering in a position of high responsibility and has attained eminence by virtue of his outstanding contribution in the field.
 - (f) Every person for election as a Fellow shall be of Indian nationality and for election as a Foreign Fellow he shall not be of Indian nationality.
 - (g) The Council may elect a person of any nationality as a Fellow or Foreign Fellow as the case may be in special recognition of his outstanding contribution in the field of engineering and such election shall be announced at the next Annual General Meeting, provided, however, that number of persons so elected shall not be more than twenty at any point of time.
41. Notwithstanding anything contained in Rules and Regulations 40(e) and (f) the Foundation Fellows of the Academy shall consist of the signatories to the Memorandum of Association. In the first year 125 Fellows shall be admitted to the Academy and thereafter not more than twenty-five Fellows and five Foreign Fellows shall be elected each year.

Provided, however, that number of persons so elected shall not be more than six hundred at any point of time.

Provided, further that the total number of Foreign Fellows on the Roll at any point of time shall not exceed fifty.

OBLIGATIONS, RIGHTS AND PRIVILEGES

42.(a) *Annual Subscription

- (i) Every Fellow shall be required to pay an entrance fee of Rs.50/- for election on or after first day of April and annual subscription of Rs.50/- payable as on the first day of April as per provisions of the Rules & Regulations for the time being direct.

- (ii) * **Life Compounding Fee:** A Fellow whose subscription is not in arrear as per Rules & Regulations 42 (a) (i) above may compound his future subscription by payment of a single compounding fee of Rs. 500/-
- (iii) * The life compounding fee shall be liable to alteration from time to time as deemed advisable by the Council, but such alterations shall not affect payments of life compounding fee already made on dates antecedent thereto.
- (b) **Rights and Privileges:** Subject to the provisions of the Articles and to the restrictions contained in the Rules and Regulations, Fellows shall enjoy the following rights and privileges of the Academy:
 - i) To be present and vote at all General Meetings
 - ii) To propose and recommend candidates for Fellowship.
 - iii) To introduce visitors at the General Meeting of the Academy.
 - iv) To have personal access to the library of the Academy.
 - v) To take out books, plates, drawing, manuscripts etc. from the library, subject to such Regulations as may be prescribed by the Council.
 - vi) To receive gratis copies of the Proceedings and Monographs of the Academy issued during the continuance of their Fellowship and of such other publications as the Council may decide from time to time and subject to the discretion of the Council, to purchase, at a reduced price, any of the Academy's publications.
 - vii) To fill any office in the Academy on being duly elected thereto subject, however, to the proviso that any Fellow appointed to any office in the Academy to which a salary or emolument is attached shall lose, for the time being, the privileges of voting.
 - viii) To offer papers and communications to be read before the meetings of the Academy.
- (c) Fellows living outside the territorial limits of India shall be

- entitled to the privileges contained in Rules and Regulations 42(b) (i), 42 (b) (ii), 42(b) (iii), 42(b) (v), 42(b) (vi) and 42 (b) (viii).
- (d) Foreign Fellows shall be entitled to the privileges contained in Rules and Regulations 42(b) (i), 42(b) (iv), 42(b) (vi) and 42(b) (viii).
 - (e) Persons elected under the provisions of Rules and Regulations 40 (g) shall be entitled to the privileges contained in Rules and Regulations 42(b), 42(c), and as may be applicable in their case.
- 43 The rights and privileges of every Fellow and Foreign Fellow shall be personal to himself as such and shall not be transmissible by his own act or by operation of law.

RESIGNATION, REMOVAL AND REINSTATEMENT

- 44. Every person elected as a member of the Academy shall cease to be member in case of death.
- 45. Every person elected as a member of the Academy shall be liable to pay his appropriate annual subscription until he shall have signified in writing to the Executive Secretary his desire to resign, having previously paid all arrears including the current year's subscription, provided that a letter of resignation may, with the consent of the Council, be cancelled at the request of the sender within six months of its receipt by the Executive Secretary but on payment of all sums which he would have been liable to pay had his connection with the Academy not been interrupted. He shall thereupon recover all his former rights and privileges without re-election.
- 46. If any member shall leave his subscription in arrears for more than three months and shall fail to pay such arrears within three months after a notice has been sent to him by the Executive Secretary, his name shall be removed from the Roll, and he shall thereupon cease to have any rights or privileges, but he shall nevertheless continue to be liable to pay the arrears of subscription due at the time of his name

being removed from the Roll. The Fellowship certificate of every such person shall be returned to the Executive Secretary.

47. The Council may, if they find good reason to do so, reinstate on such conditions as they may deem fit, any person who has been a Fellow or Foreign Fellow and whose name has been removed from the Roll on account of resignation or non-payment of subscriptions. These cases shall be considered and reported upon to the Council by the Executive Secretary. The reasons shall be communicated to the Fellow concerned.

FINANCES

48. The revenue of the Academy shall form the general funds of the Academy and all its property, income and effects, of whatsoever kind, are vested in the Council such for the furtherance of the aims and objects of the Academy as defined in the Memorandum of Association.
49. Under no pretence whatever shall any such property income, revenue or effects of the Academy derived howsoever, be paid or transferred directly or indirectly, by way of dividend or bonus or otherwise by way of profit to the members of the Academy except in the case of and as a salaried officer or employee of the Academy. Provided always that nothing herein contained shall prevent:
 - (a) The payment by the Academy in good faith of reasonable and proper honorarium to any member of the Academy for any services rendered to the Academy.
 - (b) The payment by the Academy of interest on money lent to the Academy by any such member or reasonable or proper rent for premises demised or let by any such member to the Academy; or
 - (c) The giving by Academy to any such member of prizes whether in cash or otherwise and scholarships for the furtherance of the aims and objects of the Academy.

- 50 (a) All entrance fees shall be regularly invested as soon as possible after the receipt thereof in short-term deposits or in fixed deposits with one or more nationalised banks as defined in Rules and Regulations 55 or one or more forms or modes of investing or depositing the money as per provisions of the Income Tax Act 1961, as amended from time to time and only the interest accruing therefrom shall be available for the general expenditure of the Academy. Such moneys and investments shall form the Permanent Reserve Fund.
- (b) The Council shall be at liberty:
- i) To vary the investments at their discretion either in fixed deposit or in short term deposit with one or more nationalised Banks as defined in Rules and Regulations 55 or in approved securities.
 - ii) To deposit all or any of the securities representing the Permanent Reserve Fund with the Bankers of the Academy and secure an overdraft of current account not exceeding Rs 50,000/- at any time; and
 - iii) To spend any portion of the Permanent Reserve Fund in purchasing land, building, furniture, and equipment for the Academy.
- (c) Save as aforesaid, no portion of the permanent Reserve Fund shall be alienated without the consent of the Fellows to be obtained by a Postal vote on which vote the majority shall be not less than three-fourth of the effective votes received.
- (d) The Council shall have the power to make from time to time such additions as they consider desirable to the Permanent Reserve Fund from the general funds of the Academy and the provisions of the Rules and Regulations shall apply to these additions exactly as if they had formed part of the receipt required by the Rules and Regulations to be invested for forming that fund.
51. All the Securities and moneys forming the assets of the Academy shall be lodged with the Academy's Bankers in the name of the Academy. Any surplus funds not required for the current

expenditure and not carried by the Council to the Permanent Reserve Fund shall be invested from time to time in short-term deposits or in fixed deposits with one or more nationalised Banks as defined in Rules and Regulations 55, or in one or more securities as per provisions of the Income Tax Act, 1961, as amended from time to time and no securities forming part of this fund shall be sold or otherwise disposed of except by order of the Council.

52. (a) The Academy shall keep proper books of accounts with respect to:
- i) All sums of money received and expended by the Academy and the matters in respect of which the receipt and expenditure take place;
 - ii) The assets and liabilities of the Academy.
- (b) For the purpose of Rules and Regulations 52 (a) proper books of accounts shall not be deemed to be kept with respect to the matters specified therein if there are not kept such books as are necessary to give a true and fair view of the state of affairs of the Academy and to explain its transactions.
- (c) The accounts of receipts and payments shall be considered at regular intervals by the Council.
- (d) The accounts shall be audited once in a year by the Auditor/Auditors of the Academy to be appointed as per provision of Rules and Regulations 56.
- (e) The audited accounts of the preceding Financial Year shall be presented by the Council for the consideration of the Fellows at the Annual General Meeting and they shall comprise:
- i) Balance sheet as on the last day of March*
 - ii) Income and Expenditure account for the year ended the last day of March* and
 - iii) Separate accounts of Endowment and Trust Funds created for specific purposes.

53. (a) The short-term deposit accounts and the fixed deposit accounts shall be operated jointly by the Executive Secretary, and Hony Treasurer or any one of the Fellows nominated by the Council.
- (b) No payments from the moneys or funds of the Academy shall be made except under the expressed or implied sanction, of the Council, and all cheques shall be signed jointly by the Executive Secretary, and Honorary Treasurer or any one of the Fellows nominated by the Council.
- 54 The name of all persons who have made any voluntary contributions to the funds of the Academy shall be published in the Annual Report of the Council.

BANKERS

- 55 The Bankers of the Academy shall be one or more Nationalised Banks (as defined by the Reserve Bank of India Act, 1934) in India as may be determined by the Council.

AUDITORS

- 56 (a) At each Annual General Meeting shall be appointed one or more properly Qualified Auditor or Auditors to hold office until the next Annual General Meeting.
- (b) Every such Auditor or Auditors shall be a member of the Institute of Chartered Accountants of India, and shall hold a Certificate of Practice granted by that Institute.
- (c) The Council may fill any casual vacancy in the office of Auditor to hold office until the next Annual General Meeting, but while any such vacancy continues the surviving or continuing Auditor or Auditors (if any) may act.
- (d) The remuneration of the Auditors shall be fixed at the Annual General Meeting at which they are appointed except that the remuneration of any Auditor appointed to fill any casual vacancy may be fixed by the Council.

NOTICES

57. A notice may be served by the Council or the Executive Secretary upon any member of any class either personally or by sending it, whether as a separate communication or included in or with one of the publications of the Academy, prepaid through the post addressed to such person at his recorded address.
58. Any notice served personally or sent by post shall be deemed to have been served or delivered at the expiration of ninety-six hours after it was posted.

COPYRIGHT

59. Each paper presented to the Academy and accepted for reading or publication in full or in abstract shall be the property of the Academy. The Council, in such cases as they may think fit, shall have power to release or surrender the rights of the Academy in respect of any such paper or the copyright thereof.

INDEMNITY

60. Each member of the Council and the Executive Secretary shall be indemnified out of the funds of the Academy and to such extent as the Council shall approve from time to time against such costs, charges, damages, and expenses as he may sustain by reason of his acting in execution of the duties or powers imposed upon or given to him by the Articles or the Rules and Regulations.
61. Each member of the Council shall not be accountable and shall not incur any personal liability in respect of any loss or damage incurred through any act, matter or thing done, authorised or suffered, being done in good faith for the benefit of the Academy although in excess of his legal power or incurred through any omission, error of judgement, or oversight on his part.

COMMON SEAL

62. The Council shall provide a Common Seal of the Academy.

The Seal shall be in the custody of the Executive Secretary and be affixed to such documents as in law are required to be sealed, but only in the presence of the President or a member of the Council. The Executive Secretary and the President or a member of the Council Shall sign every instrument to which the seal of the Academy is so affixed.

LEGAL PROCEEDINGS (Section 6 of the Act)

- 63 The Academy may be sued in the name of President/Secretary as per provision laid down under section 6 of the Societies Registration Act, 1860 as applicable to Union Territory of Delhi.
- 64 Amendment/alteration, extension or abridgement of 'Purposes' aims and objects or change of name, under Sections 12 and 12A of the Societies Registration Act, the amendment shall be made under this section.

DISSOLUTION AND ADJUSTMENT OF AFFAIRS

- 65 If the Academy need to be dissolved it shall be dissolved as per provisions laid down under Sections 13 and 14 of the Societies Registration Act, 1860 as applicable to the Union Territory of Delhi.

APPLICATION OF ACT

66. All the provisions under all the Sections of the Societies Registration Act, 1860 as applicable to the Union Territory of Delhi shall apply to this Academy.

ESSENTIAL CERTIFICATE

67. Certified that this is the correct copy of the Rules and Regulations of the Academy

(Sd/-)
PRESIDENT

(Sd/-)
HONY SECRETARY

(Sd/-)
HONY TREASURER

8. ORDINANCES

* ELECTIONS TO THE GOVERNING COUNCIL

Election of the office bearers and other members of the Council shall take place as per the procedure prescribed below:

Office Bearers

2. The Council shall elect from amongst its members a President, the Vice-Presidents and the Honorary Secretary at its meeting to be held in June/July every alternate year.
3. Members of the Council being considered for election as office bearers shall not participate in the election for the respective positions and their non-participation will not affect the quorum.
4. The Council at its meeting in August/September, shall announce the names of the President, the Vice-Presidents and the Honorary Secretary elected by the Council who will be installed at the ensuing Annual General Meeting of the Academy.

Elected Members

5. Every alternate year, not later than first day of May, the Council shall send to each Fellow (who has paid his subscription for the current year) a list of Fellows in each Section inviting nominations from the Sections to fill the vacancies in the Council.
6. The Fellows may nominate a person from their respective Sections to fill the vacancy by delivering such nominations in writing, together with the written consent of the nominee to accept membership if elected, so as to reach the Executive Secretary not later than *31st day of May*.

- 7 The Council, not later than 20th day of June, shall send to each fellow entitled to vote, a ballot paper containing the names of all persons duly nominated from the engineering Sections, to fill the vacancies referred to in Rules & Regulations 3(b) (v).
- 8 Each Fellow, voting, shall put only one cross mark against the names contained in the ballot paper and it shall be posted, after its issue, to reach the office of the Academy not later than 31st July. Any ballot paper reaching after 31st July shall be declared invalid.
- 9 At the meeting of the Council in August/September, the ballot papers shall be opened by a Broad of Scrutineers appointed by the President and results reported in the Council. The names of the elected members shall be announced at the Annual General Meeting of the Academy.

Nominations to the Council

- 10 The Secretariat shall, in every alternate year, not later than first day of May address a communication to cooperating Academies, the nodal Ministry of the Government of India, the All-India Council of Technical Education and Professional Societies in India to nominate the person as given in Rules and Regulations 3(b)(vi), (vii), (ix) and (x) of the Academy. The nominations should reach the Secretariat by 31st July. In case less number of names of persons belonging to the Professional Societies are received, the Council shall have the discretion to nominate the balance number of Fellows to the Council at its next meeting in August/September.

*SECTIONAL COMMITTEES AND THEIR RESPONSIBILITIES

1. The Council shall appoint, from amongst the Fellows of the Academy, Committees representing the several branches of engineering and called 'Sectional Committees'. The members of each Committee shall be chosen with a view to securing as far as possible, a representation of the several sub-divisions in each engineering Section.
2. Each Sectional Committee shall advise the Council upon matters referred to it by the Council, and shall make to the Council such suggestions as it may think desirable touching the branch or branches of engineering which it represents such as:
 - (a) in connection with communications received from Government on engineering sciences of high policy;
 - (b) subjects to be discussed by the Council so that the Academy can play its part in national development and planning;
 - (c) drawing up list of persons suitable for scrutinising papers submitted for publication;
 - (d) advising on the books and journals which should be added to the Academy's library;
 - (e) suggesting new engineering research problems of both fundamental and applied nature which the Academy should initiate in the national interest; and
 - (f) making such recommendations on the list of nomination circulated to the Sectional Committees by the Council as to the selection of candidates for admission in the Academy as Fellows.
3. The Council shall, in each alternate year, appoint a Member from each Committee to serve as Convener and to be the channel of communication between the Committee and the Council.

4. Sections

The sections shall be ten in number and referred to by number and not by name. The allocation of subjects to the Committee which is only indicative but not exhaustive, shall be as follows:

SECTION - I

Engineering Mechanics, Structural Engineering, Earthquake, Blast and Wind Engineering, Foundation Engineering and related Technology, Architectural Engineering.

SECTION - II

Fluid Mechanics, Hydrology, Water Resources, Water Supply Systems, Irrigation Engineering, River Engineering, Docks and Harbour Engineering.

SECTION - III

Mechanical Engineering, Automobile Engineering, Agricultural Engineering, Robotics, Automation, Products design and Production Engineering and Cryogenic Engineering.

SECTION - IV

Chemical Engineering, Textile Engineering, Food Technology, Post Harvest Technology, Chemical Technologies including Paper Polymer, Rubber and Leather, Petroleum, Fertilizers, Pharmaceuticals etc.

SECTION - V

Electrical Engineering, Power System and Distribution, Electrical Materials and Technologies.

SECTION - VI

Electronics, Telecommunications and Computer Science and Engineering, Telematics and Informatics.

SECTION - VII

Marine and Ocean Engineering, Transport Engineering, Aerospace Engineering, Space Technology, Rocket and Missile Technologies

SECTION - VIII

Metallurgical Engineering, Material Science and Engineering, Mining and Geological Engineering.

SECTION - IX

Bio-technology, Bio-Engineering, Environmental Engineering, Non-Conventional Energy Engineering.

SECTION - X

Specialised and Inter-disciplinary Engineering, Reliability Engineering, Construction Technologies, Remote Sensing and Engineering Surveys, Educational Technology and Industrial Engineering.

NOTE: The above disciplines will also include Science & Technology

5. Each Sectional Committee shall consist of not more than seven members. The tenure of the Sectional Committee shall be for two sessions. Members of the Sectional Committee shall be eligible for further two sessions.
6. In the event of the Convener or a member of the Sectional Committee being unable to perform the duties due to death, resign or any other cause, or in the case of his prolonged absence from India for any reason, the Council shall appoint another member to fill the vacancy for the residual term provided such residual part is not less than two months.
7. The appointment of Fellows to serve as new members of the Sectional Committees shall be made by the Council in August/September and will take effect from the date of the Annual General Meeting.



Shri Rajiv Gandhi, Prime Minister of India, addressing the Foundation Function on 11 April, 1988.



A view of the Dias:
Prof S.N. Mitra, Prof Jai Krishna, Shri Rajiv Gandhi,
Shri P.V. Narasimha Rao and Shri K.R. Narayanan.



Fellows of the Academy at the Foundation Function
at Teen Murti House, New Delhi.

9. FOUNDATION FUNCTION

The Foundation Function of the Academy was held in New Delhi on April 11, 1989 in two parts. In the morning, the first general assembly of the Fellows was held at the India International Centre, where a large number of Fellows were formally introduced and admitted to Fellowship. In the evening, the second part of the function was held at the Nehru Auditorium, Teen Murti House, in the presence of Shri Rajiv Gandhi, Prime Minister, Shri P.V. Narasimha Rao, Minister of Human Resource Development, Shri K.R. Narayanan, Minister of Science and Technology, and a large number of distinguished guests. The function was presided over by Shri Narasimha Rao, while Shri Narayanan released the Souvenir specially prepared to mark the occasion. Shri Gandhi was the Chief Guest. The speeches delivered by Prof. Jai Krishna, Shri Narayanan, Shri Narasimha Rao and Shri Gandhi are reproduced below :

PROFESSOR JAI KRISHNA

Honourable Mr. Prime Minister, Honourable Minister of Human Resource Development, Honourable Minister of Science and Technology, Distinguished Guests, Fellows of the Academy, Ladies and Gentlemen,

It is my proud privilege to extend to you all a very warm welcome to the Foundation Function of the Academy and especially to you, Mr. Prime Minister, who has spared some time for us out of a very heavy schedule to inaugurate the foundation of the Academy today. We are indeed grateful to you. I am sure your continued interest in the Academy will put it on sound footing and ensure its success in discharge of its responsibilities. I also extend a special welcome to the Honourable Minister of Human Resource Development, who has very kindly agreed to preside over this function and to the Honourable Minister of Science and Technology for kindly agreeing to release the Souvenir prepared to mark the

occasion. With support from you all, the Academy's foundation will have been truly laid and, it is hoped that the Academy will, in due course, prove to be an asset to the country's development in the fields of Engineering and Technology, which indeed are powerful tools in the social battle to end poverty and raise standard of living.

The Academy has been established in response to the desire of the fraternity of engineers-scientists and technologists that has been feeling for sometime that the infrastructure in Engineering and Technology has now been well established through different institutions and organisations and there is ample talent available -- quantitatively and qualitatively -- to man a 'Peer' organisation like the Academy particularly recognising the fact that engineering and technology have a multi-disciplinary character and need a forum for such interaction to promote all-round excellence.

In the post-independence period, the engineers, scientists and technologists could claim credit for executing gigantic projects in river valleys, space, energy and industry of various types. The latest development is the design and construction of ground-to-ground missile and the Remote Sensing Satellite. The country has every reason to be proud of the contributions made by Indian Scientists, Engineers and Technologists in the short period of 40 years. At the same time, it is realised that, as it has happened in every other country, our development had substantial inputs from other countries, but it is now felt that, for a country of our size, and its human and natural resources, speedy move towards self-reliance is essential, while fresh air from other countries should always be welcomed where necessary. This would necessitate our having an organisation, which could weigh carefully and project the capabilities possessed by the country, select what we should develop indigenously and where collaboration with other countries is necessary. Such fields could be reviewed from time to time as indigenous capability develops.

This function could very well be performed by the Academy, which should be composed of the best talents from the entire spectrum of engineering and technology in the country. Its fellowship should be a hallmark of excellence of an individual in his

sphere of expertise. It should also have a few honorary foreign fellows on its rolls from among those who have received similar recognition in their own country and have been associated with India in some way. So far 71 Fellows and one Foreign Fellow have been enrolled and it is proposed to take this number to about 600 in due course. They will be well distributed over the various disciplines to cover the whole range of Engineering and Technology.

The Academy proposes to provide a forum for futuristic planning for the country's development requiring engineering and technological inputs and bring together specialists from such fields as may be necessary for comprehensive thinking of the needs of the 21st century, so that, in the next 10 to 15 years, we have an up-to-date technological status and be even an exporter of new technologies.

Another sphere in which the Academy proposes to work is the preparation of historical and critical technological review of the major projects taken up so far in the last 40 years in order to draw lessons for the future. This would lead to improvements in reliability of products and processes. At present, this work is not being done systematically although records are maintained for most major works.

There are certain national problems which should be taken up by the Academy to expedite development. For example, optimum utilisation of water resources with the highest benefit to cost ratio to the country taking into account special regional problems, could be one field in which independent and objective assessment of the Academy could be helpful in settling many interstate problems.

Similarly, the problems of Hazard Reduction involving engineering inputs could be worked upon by the Academy. The United Nations have recently declared the last decade of this century as a Hazard Reduction Decade on the recommendation of the U.S. Academy of Engineering. This programme relates to the hazards caused by Earthquakes, Landslides, Cyclones, Floods and Droughts. The Academy could play a useful role if the Government of India participates in this international exercise. Also in the same cate-

gory is our concern about environment vis-a-vis development projects. This is a matter that requires formulation of our own policies, since these have to be different from those for well developed countries. We have to go ahead with the development projects for 'removal of poverty' and yet avoid harmful effects on environment. It would need socio-technological assessment to take up preventive measures long before a project is taken up, since we have to develop all our resources. The Academy should play its role in this respect.

The Academy would naturally be concerned with the issues of academic excellence, achievements and growth of educational systems, which would finally reflect on the quality and reliability of performance and products. The national policies may formally recognize the role of the Academy in this respect.

The Academy could help the Government in the fulfillment of objectives that the new educational policy makes with respect to technical education, and through periodic reviews, monitor status of excellence in technical institutions as necessary.

There is another important function that the Academy should perform and it is the recognition of young engineers and technologists who show promise in creative research and innovation and provide them all the support it can in pursuance of their work. In this regard, it may consider creating a cadre of Academy Associates, which will indicate their having been picked up for their excellence and provide the young people an incentive for further work.

There are many other areas relating to energy, transport, pollutions of various types, communications etc., in fact too many to enumerate here, which the Academy could take up in due course.

In fulfilling these tasks, however, we feel it is extremely important that the Academy maintains objectivity and independence in its technological recommendations and, therefore, it is essential that its activities are funded primarily by the Central Government. I hope the Government of India will come forward and provide us

with necessary support. The only criterion that the Academy should lay down before itself in the study of various problems is the social benefits as foreseen by the representatives of the people, and the 'maximum benefit from minimum inputs' irrespective of other considerations.

The establishment of the Indian National Academy of Engineering has been warmly welcomed by the International Fellowship of Engineering Academies. This academy has, therefore, joined the Fellowship for purposes of exchange of ideas regarding problems taken up by academies in different countries, and collaborating with Fellows of other Academies for mutual benefit such as work on Hazard Reduction Decade.

In the end, I express the hope that the country will welcome the establishment of this Academy and make full use of its forum in the interest of the country. On behalf of the Academy, I wish to assure you all, that it would do its best to contribute to the development and modernisation of our engineering and technological activities. The Academy will thus fulfil the long standing need for establishing such an organisation, which has come into being at the right time, when we have laid the foundation of an industrial base and an accelerated progress is feasible. I hope it will receive full support in this task from all.

Thank you.

SHRI K.R. NARAYANAN

Honourable Prime Minister Shri Rajiv Gandhi, Honourable Shri Narasimha Raoji, Prof. Jai Krishna, Prof. Mitra, distinguished Fellows and friends, I consider it a great honour to have been asked to release the souvenir on the occasion of the foundation of the Indian National Academy of Engineering. This is a significant occasion. India is dotted with examples of triumphs of science and technology from ancient time, in the form of splendid monuments and temples and today, with great river valley projects, aircraft, space-craft, launch vehicles, missiles and excellent facilities like roads, railways and housing complexes for the people. It is engineers who convert the dreams of scientists and statesmen

into practical and enduring realities.

As such, it is significant that we have at last formed an Indian National Academy of Engineering. It can not only consolidate our past achievements but can also become a forum for the promotion of engineering and technology in the future. It is particularly satisfying that it gives great importance to the recognition of, and support to young engineers and technologists. I understand that probably within the next ten years, the present generation of senior engineers and technologists would have retired and therefore, we need the young engineers and technologists to come up and take their place. Therefore, the emphasis given by this Academy for the recognition and encouragement of young talents is an important objective. I have great pleasure in releasing this souvenir which contains the history as well as the aims and objectives of the Academy.

SHRI P.V. NARASIMHA RAO

Mr Prime Minister, my colleague Narayanan Ji, Prof. Jai Krishna, Dr. Arunachalam, Prof. Mitra and distinguished Fellows of the Academy. I am very happy to be here today on the occasion of the foundation function of the Indian National Academy of Engineering. As the president of the Academy, Prof. Jai Krishna has already pointed out, the setting up of a national academy of engineering in the country is a momentous occasion and it signifies the maturing of the engineering profession. Contribution of engineering technology and related sciences to the national development, and even more importantly, their enormous potential for making far-reaching contribution in the future is well recognised and needs no elaboration. The presence of the Prime Minister on this day is ample proof of the importance the nation and he personally attaches to the growth of engineering and technology in the country. Looking into your constitution, I find that the Academy is supposed to be an Apex body for all the engineering disciplines and its objectives are wider in scope and distinct from those of the professional societies. This is an Academy for recognising and promoting excellence in all disciplines of engineering and technology now being practiced in India. What particularly interests me is the aim of the Academy to promote the national policy

of education in all matters of technical education and also to assist the Government of India, the local governments, and the All-India Council for Technical Education in conducting various analysis and forecasting the technologies of the future for the purpose of planning and formulating policies in respect of engineering education. It is a very important and laudable task and it is natural for the Academy to choose it. The pace of technological change, as we all know, has been accelerating over the years and the rate has recently reached spectacular proportions. It will require the combined effort of all the professionals and academics to see that the country not only keeps abreast of the technological changes, but is also able to anticipate them and prepare for them effectively through programmes of education, training, research and development. The academics and the practising leaders of the engineering profession who are Fellows of the Academy have a special responsibility in sensing the direction of change, updating current technologies, developing new technologies, and creating a spirit of innovation and creativity that would help India achieve leadership in the community of nations. I must emphasise that this is not merely a wishful thinking nor is it a chauvinistic view. Considering what the country has already been able to achieve, and the dedication of our scientists, engineers and technologists, it is entirely within our reach to acquire the kind of leadership in at least a number of selected areas. The key, of course, is the pursuit of excellence and creating a professional environment of work, and observance of professional ethics, which sustains and further promotes excellence. I understand that the Academy has already chalked out a programme to discuss nationally important issues which admit of engineering solutions. It is indeed a most valuable exercise and I am sure the advice of this body will receive due consideration.

I may also add that engineering is the profession of putting scientific and technological advances to work in the services of the society. Members of this profession should have keen understanding of issues of social and economic development and should develop their solutions not merely as an innovative exercise of application of new technology, but as a solution which optimises the social benefits and which takes into account social and economic constraints within which the nation operates. As you know, the

AICTE (All India Council for Technical Education) has just been made as a statutory body after decades of the persistent demand. AICTE will now have to discharge important functions of coordination, planning, promotion and regulated development of technical education system in the country. One very important responsibility given to the AICTE is the maintenance and improvement of standards of technical education. It is a role in which the Academy can assist effectively. I hope the individual Fellows of the Academy will personally and collectively watch the standards of technical education and do everything possible on their part to see that the new entrants to the profession are of quality that a nation can justifiably be proud of. Mechanisms and linkages that would be necessary to feed the Academy and the AICTE for meeting this common objective will naturally have to be worked out. But I am happy to tell you that we have already provided membership to this Academy in the AICTE. I also note that you have taken upon yourself the task of promoting and advancing the practice of engineering technology and related sciences in the country. This is a complex task and has many dimensions to it. This means that on one end of the spectrum the students who come out of the engineering institutions would have an appropriate mix between theoretical knowledge and practical skills and on the other, they will have the appropriate opportunity and environment in which engineering can be practiced effectively and creatively. The first is an educational task, but the latter is a much wider task of system transformation and development. Even the task of keeping this force up-to-date in information and skills is a gigantic one. I am happy to see that the Academy is willing to tackle this responsibility. It is often said that science is universal, but technology is specific to a particular region. While appreciating the thought behind the statement, let me say that technology too is no longer bound by national boundaries and in a sense has become universal. It is, therefore, important that the Indian National Academy of Engineering interacts with other Academies and Professional bodies around the world and makes available the expertise needed to solve our problems and perhaps the problems of other countries too. In this context, it is heartening to note that the setting up of the Academy of Engineering here has already been welcomed by prestigious Engineering Academies from different parts of the world. I would like to believe that their messages of

good-will are not merely out of politeness but are recognition of the basic quality and strength of the Indian Engineering profession. Finally, let me say that I consider it a privilege to have been associated with the occasion of birth of country's only Academy of Engineering. I am sure in the years to come the Academy will realise its full potential and become an important force for our social, and economic development. I wish you all success in your endeavours.

SHRI RAJIV GANDHI

I would first like to congratulate all the scientists and technologists on whose initiative we have brought together this National Academy. This Academy must emerge as a true centre of excellence and as a reservoir of outstanding talent to be placed at the disposal of the country.

The poverty gap is essentially a technology gap. What separates the developed from the developing is the level of technology that is used directly or indirectly in the everyday lives of our people. Within a country, within India, what defines and distinguishes the better-off from the worse-off is again the quantity and quality of technology that they use in their daily lives.

Till the mid 18th century, in most respects India was at the vanguard of world technological development and India had held this position virtually without interruption from about the 6th century B.C. and perhaps even pre-Aryan India was on par with Sumeria and Egypt.

Therefore, it is no longer a historical perspective in which we see our backwardness or our poverty, it is in fact an aberration in our history and our heritage and our natural place must be at the fore-front of development and technology and thinking. And, it is to that fore-front that this National Academy must target India to take us there in the least time possible, not just as an individual responsibility but as a national task.

We have seen during these last forty years of Independence that the principles and policies that had been enunciated and

implemented by Gandhiji, by Jawaharlal Nehru, by Indiraji, were very much in the right direction and had strengthened and built our foundations. We have succeeded in developing our human resources and in developing a basic trained manpower and our mental resources in the country.

One causalty of our education system has been scientific teaching. Although we have reached peaks and pinnacles in a number of areas, but the average is not something that we are too proud of. Very few schools have laboratories or really properly qualified teaching staff. Universities are sub-standard. Even professional laboratories and institutions leave much to be desired. Despite these handicaps we have succeeded in building the third largest reservoir of trained manpower. It is because the innate scientific and technological aptitudes of our people. Therefore, with some improvement in our human resource development we can forge ahead to the vanguard of technological advancement.

To eliminate poverty, we must improve the technology input at the lower levels and the power segments of our society. A good example is the Green Revolution where very high technology was made available at the farmers level, some of it directly in terms of seeds, other which the farmer doesn't see perhaps a nuclear power plant generating energy for his pumps. But, ultimately it is the quality of input that we get at the lowest levels which will help us to remove poverty.

We have developed a number of technology missions to carry out just this task, to direct the highest technology and scientific development towards removing poverty, and the war on poverty. By pulling together all that is required in technology and managerial power and strength, by putting together the best in scientific developments and breakthroughs, we can meet the needs of the poor. In India today, the prime need is a higher and more sophisticated technology to meet the needs of the poorest sections of our society. There can be no poverty alleviation without technological upgradation.

The Academy must keep in mind the basic aim of poverty elimination as a fundamental objective and forum of all indigenous engineering efforts. In the last forty years, Indian engineer-

ing has demonstrated its ability to absorb and assimilate imported technology. Good and imaginative adaptation of technology has taken place to make it more useful in our conditions.

But, all is not so well. Generally, we have not been generating our own technology to meet our requirements or indigenously developing imported technology to eliminate further imports and keep up with developments in the world. Also, there have been very few real contributions from India at the frontiers of science.

The first step as developing nation must be to buy and assimilate the technology. From there we must move on to developing that technology so that we can use it better for ourselves. We have gone through both these phases. The next phase must be to breakthrough to the frontiers and show the world that it is not just a question of catching up and achieving what others have achieved, but India can and will break out to the frontiers up-ahead of the others.

The major task of the Academy is to chalk out the future course for Indian engineering using inter-disciplinary advantages and the vast and diverse experience that your fellows have in India and abroad. The country expects you to demonstrate that India can be innovative, that India can show imagination and we can orient science and technology to the three basic directions - of indigenous development of imported technologies, of indigenous generation of new technologies and of moving to the frontiers to put Indian science and technology at the front rank in the world. Your efforts are needed in Industry to bring about self reliance which till now has been achieved at a very high cost. Self-reliance must be more efficient. It must produce high rates of growth and wide range of manufactures. We have to breakaway from the high cost low productivity and poor quality that we have got stuck in.

In the next phase, we have to achieve in many areas where we are on the verge of breaking through. There are some areas where we are now almost touching the frontiers, in many areas of defence electronics, we are at the frontiers in the drug industry, in the catalysts, our remote sensing satellite and the Prithvi, (*) all

(*) Prithvi - the indigenous Surface to Surface Missile which was successfully tested on February 25th, 1988.

bring us right up the front line, but except for the drugs and the catalysts we are just that scratch behind and that is what we have to break out of now.

It has taken us forty years to catch up to these frontier areas. This is the time that we must show the world that we can break through and give a lead in a number of areas. After two centuries' stagnation we are on the way to acquiring technological and scientific self-reliance. We have acquired the ability to achieve but we are still to fully achieve. The Academy's duty will be to bridge that gap between the potential that has been created, between what is achievable and what India must achieve.

My good wishes to the Academy.

The Function concluded with a vote of thanks by Prof.S.N.Mitra





Prof Jai Krishna, President addressing a Press Conference on 8 May, 1987 on establishment of INAE. On his left is Prof S.N. Mitra, Hony Secretary and Shri Y.L. Agarwal, President IETE and on the right Dr. Satish Chandra, President IE (I)



Prof Jai Krishna at the first Council Meeting on 9 May 1987. Left: Prof S.N. Mitra, Prof G.S. Sanyal, Prof Ashoka Chandra and Prof A. Bhattacharyya.

SELECTED PRESS REPORTS

ENGINEERING ACADEMY

A number of organizations, including the Institution of Engineers (India) and the Institution of Electronics and Telecommunication Engineers, have come together recently to form a National Academy of Engineering essentially to supplement the work of the Academy of Science.

The new academy, head quartered in New Delhi, has been set up with the aims of "providing means to assess the constantly changing needs of the country in engineering and technological spheres and to encourage such engineering research has may be advisable in the national interest in the near and distant future."

The second aim would be to "provide assistance to Parliament Governments and society in monitoring and guiding growth and development of engineering and technical education."

The third aim would be to "provide a bridge between the work of scientific organizations, universities and industry and other user organizations for planned and forward-looking industrial growth of the country."

The other aims include recognizing outstanding talents in the field of engineering, establishing contacts with similar organizations abroad, and "offering the Government assistance on national policies."

The first President of the new academy is Professor Jai Krishna. The two Vice-Presidents are Dr V.S. Arunachalam and Dr G.R. Toshniwal. The Secretary is Professor S.N. Mitra, while the Treasurer is Professor A.B. Bhatlacharya. The Foreign Secretary is Professor G.S. Sanyal, and other members of the Governing Council are Professor Ashoka Chandra, Dr. Bharat Singh, Dr. A.M. Michael, Professor B.R. Nag, Dr N.M. Swani, Dr S. Varadarajan and Colonel S.P. Wahi. The Council will also have representatives from the Union representatives from the Union Government, the AICTE, other Indian academic, and the Indian Science Congress Association.

-Statesman
11 May 87

National Academy of Engineering formed

The formation of the Indian National Academy of Engineering (INAE) was announced here by the President of its Governing Council, Prof. Jai Krishna, former vice-chancellor of the Roorkee University.

Prof. Jai Krishna said the Academy had been formed with the efforts of the Institute of Engineers (India) and the Institution of Electronics and Telecommunication Engineers. Its sole objective would be to supplement the work of the Indian National Science Academy by assessing the constantly changing technological needs and mould the engineering research to match the challenge posed by the swift shift in technology.

The new academy would also strive to establish contact with similar institutions abroad to exchange information.

Prof. Jai Krishna explained that the need for setting up such an apex body with outstanding personalities in different disciplines of engineering had been felt for long but the idea took shape recently when the body was registered. - Our Staff Reporter

Hindu
10 May 87

Professional body of engineers set up

A professional body of engineers - The Indian National Academy of Engineers (INAE) - has been set up to provide direction to the country's industrial sector and monitor the development activities.

To be evolved on the pattern of the Indian National Science Academy (INSA), the INAE would also extend its expertise to the government in framing the national policies on engineering and technological disciplines, according to the honorary secretary of INAE, Prof. S.N. Mitra.

Initial support in forming the academy was received from the Institution of Engineers (India) and the Institution of Electronics and Telecommunication Engineers. Prof. Mitra said, adding that the academy would comprise eminent engineers in and outside the country.

"The investment by the government for rapid industrialisation and economic development is the largest in the engineering sector and yet our industrial growth has been very unsatisfactory, compared to many developing countries. This academy will focus attention on national issues on industrialisation, advise the government on appropriate steps to be taken and monitor the growth of our industrial sector," Prof. Mitra said.

-Times of India
10 May 87

FELICITATIONS

Council of Academies of Engineering and Technological Sciences

The Council of Academies of Engineering and
Technological Sciences congratulates the

Indian National Academy of Engineering

on its establishment in New Delhi on April 20, 1987.

The Indian National Academy of Engineering also has
the best wishes of the Council in its future endeavors
to promote the beneficial application of engineering
and technology to society.

MEMBERS OF THE COUNCIL

*Australian Academy of Technological
Sciences and Engineering*

*Academy of Technical Sciences of
Denmark*

*National Academy of Engineering of
Mexico*

*Royal Swedish Academy of Engineering
Sciences*

*Fellowship of Engineering of the
United Kingdom*

*National Academy of Engineering of the
United States*

David Harris
President of the Council

September 9, 1987

FELICITATIONS



The National Academy of Engineering
of the
United States of America
extends congratulations and best wishes
to the
Indian National Academy of
Engineering
on its establishment at New Delhi
April 20, 1987

Robert M. White

*Robert M. White
President*

10. ANNUAL REPORT

COUNCIL

The present Governing Council assumed office after the establishment of the Academy on 20th April, 1987 with its offices temporarily located at the Institution of Electronics and Telecommunications Engineers, New Delhi.

The council held 13 meetings at different places in the country. The first meeting took place on 9th May, 1987 at India International Centre, New Delhi. The second on 20th June, 1987 at the Institution of Engineers (India) Building, New Delhi. The third, fourth, fifth, sixth, seventh, ninth, tenth, eleventh and twelfth were held on 25th July, 1987, 20th August, 1987, 31st October, 1987, 22nd December 1987, 21st February 1988, 25th June 1988, 1st October 1988, 17th November 1988 and 18th March 1989 at Indian Institute of Technology, New Delhi. The 8th meeting was held on 11th April, 1988 at the Institution of Engineers (India) Building, New Delhi and the 13th meeting on 14th April, 1989 at G.S. Institute of Technology and Science, Indore.

A Special General Meeting of Fellows to consider amendments to Rules and Regulations of Academy was held on 14th April, 1989 at G.S. Institute of Technology and Science, Indore.

FELLOWSHIP

The Academy started with 14 Foundation Fellows as on 20th April, 1987. The Council elected 97 Fellows during the period on the recommendations of the various Sectional Committees and one Foreign Fellow.

The Academy deeply regrets the sad demise of Prof.B. Chatterjee (Sr.) during the period. He was an eminent academician and a distinguished Fellow of the Academy.

GRANTS

The Academy conveys its grateful thanks to the following organisations for the grants given by them for undertaking the various technical activities.

	Rs.
1. Institution of Electronics and Telecommunication Engineers	50,000
2. Institution of Engineers(I)	1,00,000
3. Deptt. of Electronics, Govt. of India	15,000
4. Ministry of Defence, Govt. of India, Defence Research and Development Organisation	1,00,000
5. Department of Science and Technology, Govt. of India	25,000
6. Water Power Consultancy Services (India)	10,000

DONATIONS

Dr. D.P. Antia : Rs.942/-

BUILDING

Efforts are being made to acquire one acre plot of land in the IIT Campus, New Delhi. Formal sanction of the Government is awaited.

WORKSHOPS/SEMINARS

A workshop on the activities to be undertaken by the Indian National Academy of Engineering was held on 20th February, 1988 at Indian Institute of Technology, New Delhi. Twenty Fellows and special invitees were present. Prof. Jai Krishna in his opening

remarks emphasised that the Academy should clearly specify, priority wise, the activities that should be undertaken during the next 2 to 3 years to tackle the problems that the country faces today. He said that this was an historic occasion when, after the establishment of the Academy, so many Fellows had come from different parts of India to take part in the workshop and to offer their considered views on problems of national importance for which the Academy should provide engineering solutions.

Prof. Jai Krishna further added that the Academy provides an inter-disciplinary forum to discuss national issues. He was confident that the Academy would prove useful to the country in offering appropriate advice to the Government on various problems. More the Academy becomes useful to the country, he added, more support from various sources, Government and public, would be forthcoming and the Academy would then be a worthwhile organisation.

Prof. Mitra gave a historical background on the formation of the Academy. He said that from the time the idea was conceived in May, 1984, it had taken nearly four years of hard work and struggle to bring the Academy into existence.

Prof. C.S. Jha, Dr. N.C. Nigam, Shri.P.C. Tyagi, Prof.N.M.Swami, Shri M.A. Chitale, Dr.R.N. Mukerjea, Prof.T.K. Roy, Prof. Ashoka Chandra, Shri C.R. Alimchandani, Prof. P.V. Indiresan, Prof. S.C. Dutta Roy, Prof. T.K. Ghose, Prof. Bharathi Bhat, Dr. K.K. Framji and Prof.B.C. Nakra participated in the discussions. Prof. Jha gave a presentation on the objectives of the Academy and the various tasks that the Academy should perform. The functional aims of the Academy according to him were knowledge generation and promotion, dissemination, advisory and others. He indicated that the work of the Academy is different from that of Professional Societies. The most important point was that the Academy should create excellence whereas the Professional Societies should promote the interest of the profession. Prof. Indiresan spoke on the Technology Watch. The criteria to be employed for identifying the technologies to be watched could be:

- a) Technological relevance

- b) Capacity to absorb
- c) Market potential
- d) Cost effectiveness

It was emphasised that there should be an understanding and a bridge between Professional Societies and the Academy. The Academy should not undertake any workshop which is in the domain of Professional Societies.

After detailed deliberations, the workshop recommended to hold mission-oriented activities in the following areas of national importance:

- a) Water Management
- b) Environment
- c) Training of Engineers and Engineering Personnel for Construction Management
- d) Energy Generation and Transmission
- e) New Materials and their impact on the country
- f) Disaster Management
- g) Engineering Design including Training Management

NATIONAL SEMINAR ON NEW PERSPECTIVES IN WATER MANAGEMENT

The Indian National Academy of Engineering sponsored and organised its first National Seminar on New Perspectives in Water Management during 15-17th April 1989. The Central Water Commission co-sponsored the Seminar and provided all the necessary technical and managerial support. The Narmada Valley Development Authority of the Government of Madhya Pradesh hosted the seminar and provided the local hospitality at Narmadanagar (Indira Sarovar Project Site) near Indore.

Decision for conducting such a national level Seminar was taken in a workshop organised by the Academy on 20th February 1988 at New Delhi, when several important national problems were identified for holding seminars and conferences by the Academy. The problem of water management was chosen as the first needing

priority, in view of the unprecedented drought experienced by the country in 1987, non-availability of water for irrigation and, when available in abundance, its wastage.

It was considered that this could be best accomplished by arranging a national level seminar on this subject where experts, handling the different aspects of water management, could come together and discuss the policy issues in depth and then recommend an action programme for the near future, i.e. for a 10-year period. The idea was to prepare a document of value, based on the outcome of the seminar for presentation to the nation's policy makers.

The Academy also thought it appropriate to request the Central Water Commission, the apex technical organisation of the country in the field of water resources development to get associated with the Academy in organising the seminar. Shri. M.A. Chitale, the then Chairman of the Central Water Commission, agreed to the request of the Academy to co-sponsor the seminar by CWC and to provide all the necessary technical and managerial support. An organising committee under the Chairmanship of Shri.M.A. Chitale with Prof.S.N. Mitra as Member-Secretary was constituted. The Committee met periodically and decided all the arrangements and technical issues for holding the seminar.

The Academy laid down two basic objectives for the seminar (i) appraisal of the nature of present water use in various sectors of the economy and (ii) evolving a 10-year action programme for improving water-use efficiency in the different sectors. To cover all the major aspects in water management, the subject of the seminar was divided into seven main themes, viz.

- (i) Agriculture and Irrigation
- (ii) Domestic and Industrial Water Supply
- (iii) Waste Water Management
- (iv) Energy
- (v) Environmental Aspects
- (vi) Science and Technology
- (vii) River Basin Planning and Management.

Each Main theme was further divided into 3 to 6 important topics. For each theme, a top level expert was identified to function as a Theme Leader. He reviewed the topic papers and also contributed an exhaustive Theme Paper covering the issues presented in the topic papers and also adding his own views on the Theme. Personal interaction between the Theme Leaders and the authors of papers was arranged before the finalisation of the papers.

In all 36 topic papers and 6 theme papers were received for the seminar (A combined Theme Paper was presented for Domestic & Industrial Water Supply and Waste Water Management). They were printed and circulated as a proceedings volume well in advance to all the participants so as to enable them to go through the papers and formulate their ideas before joining the deliberations at the seminar.

To ensure selective high level participation, only the Fellows of the Academy, authors and Theme Leaders were invited to participate in the seminar along with a few special invitees. The total participation amounted to sixty experts from various Central and State Govt. organisations, educational institutions, research establishments and consulting organisations dealing with the different aspects of water management.

The seminar was inaugurated by Kumari Vimla Verma, Minister of Irrigation, Narmada Valley Development Deptt. and Public Health Engineering Deptt. of Govt. of Madhya Pradesh at a simple inaugural ceremony held at 12.00 Noon on 15th April, 1989 at Narmadasagar. The function was presided over by Shri.R.S. Khanna, Vice-Chairman, NVDA. Dr. Jai Krishna, President, INAE welcomed the gathering and after an address by Shri M.S. Rao, Chairman, CWC, the key note address was delivered by Shri M.A. Chitale, Convenor of the Seminar.

In his welcome address, Dr. Jai Krishna expressed great satisfaction that the problem taken up for study and discussion at the seminar was not only on engineering interest but was also of great concern for the society in general. Shri M.A. Chitale in his key note address cautioned that the development of additional

water resources was going to be an uphill task and would need tremendous effort both in physical terms as also in terms of financial outlays, because of the serious constraints such as the non-availability of good storage sites and the high cost of construction at the difficult sites. Hence a conscious decision would have to be made for improving the efficiency of water already harnessed and by recycling water wherever feasible for meeting the future demands of water.

Kumari Vimla Verma in her inaugural address congratulated the organisers for selecting the themes of the seminar so appropriately. She further emphasised that the domestic and industrial water supply should be the first priority requirement these days and would have to be made the essential component of all the reservoir schemes. She hoped that the picturesque, serene and calm environments of Narmada river and beautiful location of Narmada Nagar, would enable indepth discussions between the engineers and scientists of all disciplines and would bring out recommendations which would have far-reaching importance and would help in developing an appropriate perspective for the development of the precious water resources of this country.

All the seven sessions were very lively because of indepth contributions from the participants who joined in the deliberations. In the concluding session, the Theme Leaders presented the broad conclusion emerging out of the deliberations on each theme. Important recommendations are listed below:

1. Enhancing introduction of water saving technologies like sprinkler and drip and their integration with the traditional water delivery systems in Irrigation.
2. Promoting intensive research on evaporation control from farms and reservoirs.
3. Planning for stream regulation to accommodate various uses of the river flow inclusive of the waste water assimilation.
4. Concern about diminishing Hydro-power component in the electric grids and therefore, the need to step up immediately hydro-power activity as a part of river valley development programmes.

5. Estimated consumptive use of cooling water for thermal stations by the year 2000 being 6 km³, and therefore, the need for careful attention to the location policy for thermal stations.
6. Need for careful handling of water as an integral element of the Environment with attention to the harmonious relationships to be established between vegetation, soil and water.
7. Reiterating the spirit of self reliance and expressing self confidence on the basis of achievements so far in the management of water works, river valley projects and the basins.
8. Resorting to extensive instrumentation and automation for proper hydrological forecasting and better water regulations.
9. Immediate setting up of the River Basin Authorities for a balanced and scientific development and management of the river valleys.
10. Undertaking of the water-shed development programme as a mass movement in the country.

In their concluding remarks, both Dr. Jai Krishna, President INAE and Shri M.A. Chitale, Secretary, Ministry of Water Resources expressed satisfaction at the deliberations and the outcome of the seminar, the first ever held under the aegis of INAE.

The Academy is now working on the final document on water management which is being planned to be brought out sometime during October/November 1989 for a formal release at an appropriate national level function.

The contributions made by CWC and NVDA to successfully organise the seminar were appreciated by all the participants and gratefully acknowledged by the Academy.

11. ACCOUNTS

We have audited the attached Balance Sheet of the INDIAN NATIONAL ACADEMY OF ENGINEERING, NEW DELHI, as at 31st March 1989, and also the Income & Expenditure account for the period 1st July 1988 to 31st March 1989.

We report that:-

- a) The books of account produced before us are in agreement with the Balance Sheet & Income & Expenditure dealt in the report.
- b) We have obtained all the informations and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit.
- c) In our opinion and to the best of our information and according to the explanations the said accounts exhibit a true and fair view.

For SURESH C. GUPTA & ASSOCIATES
CHARTERED ACCOUNTANTS

(Suresh C. Gupta Partner)

Place : New Delhi

Date : 3rd April 1989.

BALANCE SHEET AS AT 31ST MARCH 1989

1,123.00

30.6.88 (Rs.)	LIABILITIES	Amount (Rs.)	Amount (Rs.)	30.6.88 (Rs.)	ASSETS	Amount (Rs.)	Amount (Rs.)
	CURRENT LIABILITIES AND PROVISIONS				LOANS AND ADVANCES		
	A. CURRENT LIABILITIES				Advance to Shri JRD Chugh	500.00	-
-	Subscription received in advance	450.00					
	Salaries payable	5,179.00			CASH AND BANK BALANCES		
			5,629.00	48,864.89	Savings Bank Account	-	
					with Indian Overseas Bank,		
					Golf Link, New Delhi	-	
	B. PROVISIONS				Savings Bank Account	1,00,121.56	
-	National Seminar on New Perspectives in Water Management	1,050.00			with State		
					Bank of India, I.P. Estate, New Delhi		
-	Telephone expenses	450.00			Cash in hand	4,100.75	
-	Audit fee	500.00			Stamps in hand	17.40	
			2,000.00	-			1,04,239.71
49,364.89				1,22,678.71			1,22,678.71

For SURESH C. GUPTA & ASSOCIATES
CHARTERED ACCOUNTANTS

Place : New Delhi
Date : 3.4.1989

(Suresh C. Gupta)
Partner

President Jai Krishna

Honorary Secretary S.N. Mitra

Honorary Treasurer N.M. Swani

Executive Secretary J.C. Ahluwalia

INDIAN NATIONAL ACADEMY OF ENGINEERING

INCOME AND EXPENDITURE ACCOUNT FOR THE PERIOD FROM 1ST JULY 1988 TO 31ST MARCH 1989

30.6.88 (Rs.)	EXPENDITURE	Amount (Rs.)	30.6.88 (Rs.)	INCOME	Amount (Rs.)	Amount (Rs.)
-	To Salary and allowance	11,291.55	-	By Grant from Ministry of Defence	1,00,000.00	
31,625.37	To Printing and stationery	11,790.23		Department of Defence Research and Development, New Delhi		
2,775.80	To Postage and telegram	3,022.50	-			
-	To Telephone expenses	1,258.10		By Grant from Ministry of Science & Technology, Department of Science and Technology, New Delhi	25,000	
3,859.70	To Conveyance expenses	18,395.00	-			
20,040.80	To Council Meeting expenses	11,582.80	-			
-	To Rent of office	1,003.35	-			
-	To Maintenance of office	1,072.50	-			
-	To General charges	1,901.65	-	By Grant from Water Power Consultancy Services (India) Ltd., New Delhi	10,000.00	1,35,000.00
-	To Bank charges	87.00	-			
-	To Provision for audit fee	500.00	-			
-	To National Seminar on New Perspectives in Water Management	41,424.50	1,00,000.00	By The Institution of Engineers (India)	-	-
-			15,000.00	By Govt. of India, Department of Electronics By Donations	-	942.00

30.6.88 (Rs.)	EXPENDITURE	Amount (Rs.)	30.6.88 (Rs.)	INCOME	Amount (Rs.)	Amount (Rs.)
-	To Depreciation on Furniture & equipment	1,379.00				
-	To Previous year's adjustments (net)	3,251.80	6,550.00	By Membership fee		30,250.00
66,857.98	To Foundation day expenses	-				
1,000.00	To Symposium & Workshop	-	-	By Interest received from Banks on Term Deposits and Savings Bank Account		6,452.80
-	To Excess of Income over Expenditure	64,684.82				
	carried to Balance Sheet		13.00	By Bank charges		-
			4,596.65	By Excess of Expenditure over Income		-
<u>1,26,159.65</u>		<u>1,72,644.80</u>	<u>1,26,159.65</u>			<u>1,72,644.80</u>

For SURESH C. GUPTA & ASSOCIATES
CHARTERED ACCOUNTANTS

Place : New Delhi
Date : 3.4.1989

(Suresh C. Gupta)
Partner

President Jai Krishna

Honorary Secretary S.N. Mitra

Honorary Treasurer N.M. Swani

Executive Secretary.... J.C. Ahluwalia



All Fellows are requested to check the entries against their names in Chapters 2 & 3 and advise, in the proforma given below, any additions/corrections they would like to be incorporated.

INFORMATION FOR YEAR BOOK - 1990

1. Full Name of Fellow (Please expand all initials)

Last name

(Capital Letters)

.....

First name

.....

Middle/other
names

.....

.....

2. Date of Birth

.....
(Date)

.....
(Month)

.....
(Year)

3. Highest Earned
Degree (not h.c.)

.....

4. Fellowship of
other Academies
& Professional
Societies
(Abbreviations only)

.....

.....

.....

5. Present Design-
nation and
Official
Address

.....

.....

.....

6. Residential
Address

.....

.....

.....

7. Telephone (Off)
Number (Res)
8. Specialisation
(Not more than
two items)
9. Awards
(National & Inter-
national from 1987
only)

Signature of Fellow

Please mail the completed form to:

Prof. S.C. Dutta Roy,
Editor of Publications
Indian National Academy of Engineering
C/o the Institution of Engineers (India)
Bahadur Shah Zafar Marg,
New Delhi - 110 002.



